

THE IRON AGE

June 25, 1931



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LIVE LEADS FOR YOUR SALESMEN

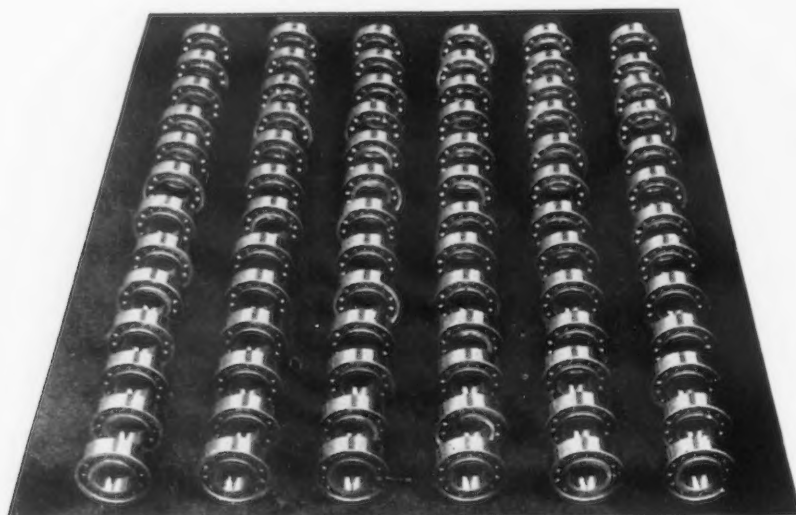
"Alluring" is no adjective to use in describing the appearance of those five or six pages of six-point type that comprise the Plant Expansion and Equipment Buying Section, which will be found each week at the end of the editorial pages. But to men who sell to industry these pages offer more fascinating reading than does No. 1 of the six best sellers. For here are found live sales leads, at a time when sales leads are much appreciated.

The 125 to 150 items per week are almost certain to yield a dozen or more leads worth a letter or a salesman's call. If properly followed up, sales will result. Just the other day the head of a certain small company told us he had kept a separate record of the business obtained in 1930 by following up these leads. IT TOTALED \$40,000.

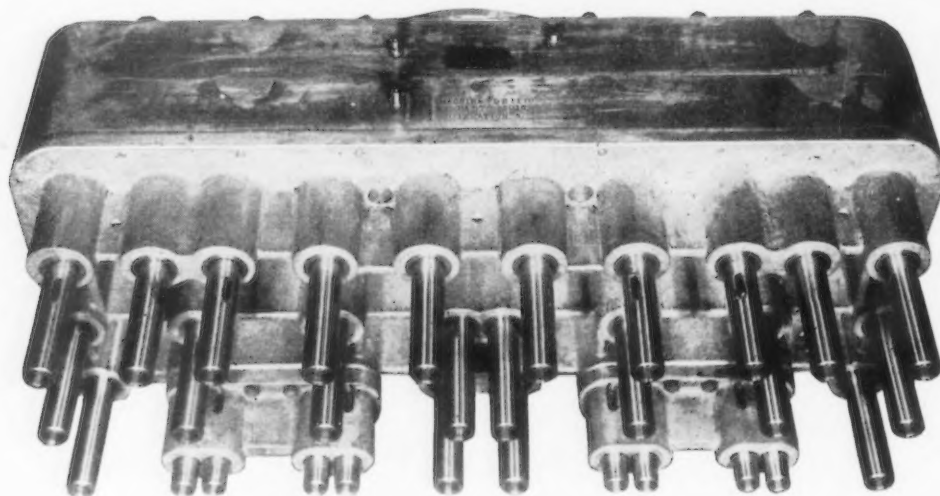
Of course it is only common sense to keep your prospect and customer list up to date by making the additions, eliminations and changes indicated.

Now turn to page 2104 and find the news nuggets in this week's industrial items.—A.H.D.





Built to Stay on the Job



Multiple Spindle Drill heads built with New Departure Ball Bearings on spindles and drive gears stay on the job, day in, day out. They are accurate and sturdy. The unit illustrated shows a U. S. Drill Head Company product in which 102 New Departures are used. In operation it is smooth and fast—needs little attention—and economizes power. The generous thrust capacity and compactness of New Departures fit them particularly well for all kinds of drilling machines. There is a heap of truth in the statement: Nothing rolls like a ball. The New Departure Manufacturing Company, Bristol, Conn.; Detroit, Chicago, San Francisco.

NEW DEPARTURE BALL BEARINGS

THIS ISSUE IN BRIEF

JUNE 25, 1931

If Industry Fails to Meet Unemployment Problems, Legislative Action Is Inevitable

The history of older countries reveals that where causes of discontent are not effectively removed through other means, it becomes a political issue.—Page 2034.

Public Treasuries Will Be Drawn on Heavily Next Winter for Unemployment Relief, Says Industrial Relations Counsel

Business depression will almost certainly extend into another winter for hundreds of thousands of workmen. Private contributions likely to decrease as public appropriations increase.—Page 2078.

This Planer Cuts Going and Coming

Rocker tool heads permit cuts being taken on both forward and return strokes. At the start of the cutting operation the rocker heads are tipped forward so that the roughing tools take the cut on the forward movement. As the table reverses, a tripper tips the counterweighted rocker heads, lifting the roughing tools and bringing the finishing tools into cutting position.—Page 2036.

Soviets Build a 250 Million Dollar Steel Plant in Siberia with Temperature Going Down to 69 Deg. F. Below Zero

The plant follows American practice, and is being built under American direction. First iron scheduled for tapping the latter part of this year.—Page 2039.

Carburizing Time Cut by Electric Furnace

Metal retort is set in the floor. Parts to be treated are placed in a basket which is lowered into the retort. Mounted on the top of the cover is a motor which turns a fan inside the furnace. An oil pot, hand regulated, is attached to the cover. When the desired depth of case has been reached oil is cut off, the charge is soaked to diffuse carbon uniformly, and basket is transferred to a sealed floor pit.—Page 2053.

If Hot-Rolled Seamless Tubing Is to Be Welded, Keep Carbon Content Below 0.35.

But as the ability to weld higher-carbon material is developed, it will be possible to make tubing with much higher tensile strength than the present 70,000 to 80,000 lb. per sq. in.—Page 2046.

Lower-Price, Low-Chromium Steel Is Beginning to Find Considerable Favor

Chromium content is 4 to 6 per cent. It exhibits increased resistance to corrosion, possesses air hardening qualities and a wide range of other physical properties.—Page 2097.

Aluminum Price Situation May Be Markedly Affected by New Development

Differential of 6c. to 10c. a lb. between primary and secondary aluminum may be reduced or eliminated by process which permits a highly refined metal of excellent physical properties to be made from aluminum scrap.—Page 2049.

Low Operating Cost Makes Diesel Engine-Battery Locomotive Well Suited for Industrial Plant Switching Service

Diesel engine and generator furnish sufficient power for yard shifting service. For peak requirements during acceleration and the like the storage battery automatically takes hold. Battery is recharged when the locomotive is idle or under light load.—Page 2052.

Scrap Aluminum Converted Into the Equal of Virgin Metal Is Claim Made for New Furnace

The molten metal is agitated by motor-operated devices which release the gases. The metal then moves through a series of chambers, where alloys are added to produce the alloy specified.—Page 2048.

Don't Specify Tubing with Too Thin a Wall

Higher physical properties now obtainable tempt buyers to decrease the thickness of the wall. This is dangerous, for resistance to corrosion is an important function of the wall thickness.—Page 2046.

Where Surfaces Are Subject to Heavy Wear, Facing with Wear-Resisting Alloys Reduces Cost

Hard alloys are applied in the form of welding rod. The material is applied when the surface of the base metal is just at a sweating heat. Parts have three to six times greater life.—Page 2055.

NEXT WEEK

AMERICA has built an immense capacity for the production of consumer goods. Unless it can find a lasting method of disposing of those products it will continue to suffer from excessive capacity (commonly called overproduction). The way to restore mass consumption, according to one authority, is by further efforts to depress costs and to increase the buying power of the pay envelope. But the return of volume business, he adds, will not solve all the industrial relations problems now confronting the country. His views will be presented in our next issue.



BILLINGS *Insertatip* Hammer

DOES the work of a solid cast lead or copper hammer for the mere cost of new tips when worn. Renewed indefinitely by replacing tips when reduced to about one-quarter their original weight. Has solid forged handle with forged cap or body; nicely balanced, immensely durable. Removing screw and cap releases old tips; inserting new tips and replacing cap gives a *new* hammer for the price of the tips. . . You'll not continue to throw away money by throwing away Babbitt or soft-nosed hammers. Your mill supply Jobber has "*Insertatips*"—awaiting your order. « « « « « « «

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THE IRON AGE

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WHAT WE CAN LEARN FROM EUROPE'S STRUGGLE WITH UNEMPLOYMENT

By GLENN A. BOWERS

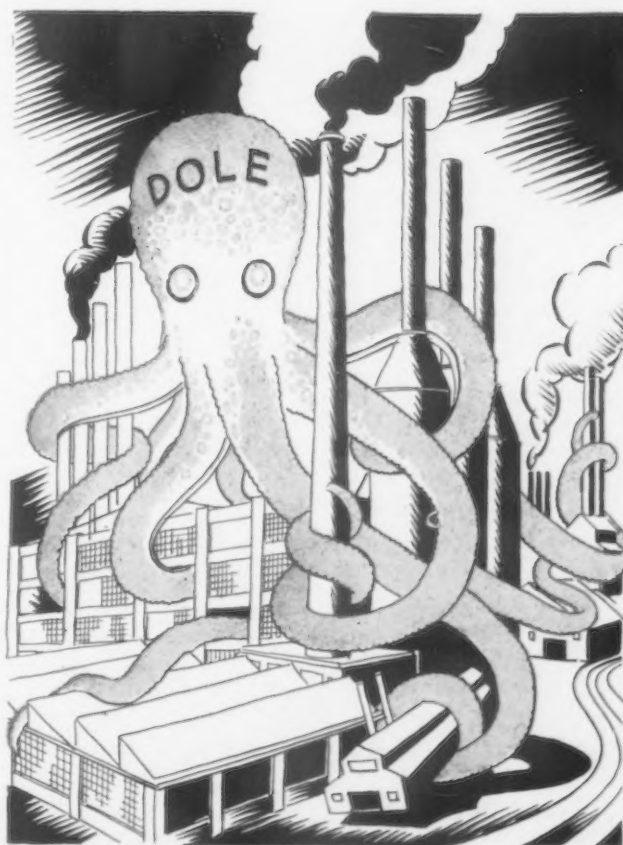
Industrial Relations Counselors, Inc., New York

IT is but natural that the solutions which have been tried for the economic and social problems of Europe should also be proposed for America. In general, these proposals have not been given serious consideration because of the vast differences in life on the two continents. It would be folly to expect that the results of legislation or industrial practice in one country can be strictly duplicated in another. Any study of European experience made with the thought of close imitation in this country is foredoomed to failure. The differences of political structure, of industrial system and social customs are too great for a direct transference of successful procedures. On the other hand, when one encounters time and again the same sequence of events, and then sees approximately a certain sequence beginning to recur in his own country, it is well to heed established experience.

Notwithstanding the peculiar conditions in each country which preclude the idea of transplanting the identical formulas to the United States as are found in Europe, there are certain broad principles which may be drawn from foreign experience. Considerable evidence

may also be derived from American experiments in support of these general conclusions. Although the following certainly do not include all lessons from available experience, they are among the most important. If these basic principles are observed in developing programs of unemployment relief in the United States, there will yet remain ample opportunity for the incorporation of provisions which satisfy the real or imaginary differences in needs of this country.

1. There is a limit below which unemployment cannot be reduced. Sir William Beveridge in his classic volume entitled, "Unemployment—a Problem of Industry," estimated that for the best years before the war there were at least 2 per cent of all workers unemployed. Noel Sargent, of the National Association of Manufacturers, has calculated that for the United States the average unemployment figure through fat and lean years combined is about 6½ per cent. It is conservative to guess that there are 1,500,000 to 2,000,000 normally unemployed workers in this country in years of high industrial activity. Some systematic provision for the maintenance and prompt read-



justment of this reserve supply of workers has become a recognized necessity.

2. Adequate statistics by local communities, by States and for the country as a whole, are essential to any organized plan for a balanced distribution of workers and for the alleviation of unemployment. Virtually every European country compiles unemployment or employment data on a comprehensive scale. One of the most serious handicaps encountered the past winter in the United States in administering unemployment relief was the almost total absence of statistical information. When the extent and character of unemployment is known, appropriate means may be devised for meeting the problem.

3. The transference of unemployed workers from one locality where jobs are filled, to other points where workers are in demand, is one of the first essential steps in prevention of unemployment. England, Germany and other countries have found this an important means of reducing benefits paid. Great reluctance has been encountered in getting employees born and raised in one industry to shift their homes to enter another industry. There is probably greater immobility of workers in Europe than in the United States.

4. Organization of the labor market for adjusting supply to demand will not be complete until there is created some agency, logically connected with the public schools, for vocational guidance.

By the same token, plans need to be laid for retraining those persons who are forced to change their occupations. Experience everywhere indicates that this is a difficult task, but one which must be accomplished if industry is to avoid the premature discarding of willing and capable workers. The changing character of industrial processes has rendered this problem particularly acute during the past decade.

5. The foregoing demands, namely, statistics of employment and unemployment, redistribution of labor, guidance of young workers into appropriate occupations and retraining of older workers, are to be achieved only in conjunction with a nation-wide system of employment offices. The backbone of European unemployment relief is the employment exchange. Since the first State public employment system was authorized by the Ohio legislature in 1890, at least 35 States have enacted similar measures. Perhaps one-half are rendering substantial services.

Nation-Wide Employment Service Essential

Congress has recently increased the appropriation to the Department of Labor for bolstering up the Federal employment service. There is general recognition among those who have studied the situation that the coordination of employment offices throughout the country is urgent. The only serious issue has arisen over the proposed right of the Federal Government to intrude into the jurisdiction of the States for the creation of employment offices where none exists. Whatever form the nation-wide employment service shall take in the United States, it will doubtless provide a place for industrial, trade and other employment offices, including those private fee-charging agencies which are now doing effective work.

Broadly, therefore, one of the most important indi-

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IN this country both employers and employees distrust the wisdom of an extension of bureaucracy as a solution of unemployment. The workman wants work, not a dole; the employer believes that the best way to prevent idleness is to keep the wheels of industry going. But the seriousness of the present depression has raised doubts as to the possibility of ever devising an effective plan of eliminating cyclical unemployment. And it is not safe to ignore the problems arising from widespread industrial idleness,

▼ ▼ ▼

cations from European experience, supported by trends in our own country, is that the organization of the labor market for contacting of workers with jobs, and for administration of relief when necessary, is inevitable. In fact, the process is already strongly under way and American industry will doubtless find itself in the years immediately ahead coming into closer and closer adjustment with local and State employment offices operating under national coordination.

There is a corollary to this trend, which is cause for genuine alarm, namely, the further regimentation of industrial employment, but this is a problem rather than an avoidable alternative. The great task which confronts American industry is to devise situations which will keep open the channels for individual achievement and stimulate personal initiative, and avoid the stultifying pitfalls of a system which deals, in part, with workers in large masses. The answer may lie in the further differentiation in employee compensation according to performance and services.

Unemployment Insurance

If a country is to have unemployment insurance, should it be compulsory or voluntary? For more than 20 years England has had a compulsory system of so-called unemployment insurance. France in 1905 inaugurated a voluntary State subsidy system. Between 1917 and 1927, 12 or 14 other countries inaugurated legislative plans of one kind or another.

European legislation for unemployment relief represents almost every conceivable type, but is broadly



since such a policy inevitably results in political action, according to the author.

Employers owe it to themselves, in his opinion, to study carefully European experience with unemployment relief so that they may insure the adoption of measures in this country that are in the best interests of industry. Mr. Bowers' views, here abstracted, were presented in a paper read at a recent meeting of the National Metal Trades Association.

classified as compulsory or non-compulsory. Although the countries are about evenly divided between the two, the proportion of total population covered by voluntary plans is only one-sixth of that in countries with compulsory systems.

Compulsory legislation is found in England, Germany, Poland, Italy and Russia. The most widely known voluntary systems are in Belgium, Holland, Denmark and Switzerland. Among these, Switzerland most nearly compares with the United States in form of government. It is a federation of States with local and Federal constitutions, much the same as our own. Virtually all other European governments are nationalistic in character. Failure to recognize this basic distinction between our government and that of England and Germany, for example, has led to many misconceptions as to the adaptability of the unemployment insurance schemes of those countries to the United States.

Ours is a country of 48 State governments—a fact which cannot be wished away by those who would centralize the solution of our unemployment problems in Washington. The issue involves, however, not merely the right of the separate States to determine what solutions may be tried out within their respective borders. There are questions of national importance as well.

Industrially and commercially the country has already become alined into several State groupings, such as New England, the South, the Middle West and the

Pacific Coast. The crossing of State borders by industrial organizations has tended to break down some of the old barriers between States and to point to the logic of a reasonable degree of uniformity between State regulations. Surely the experience of Europe with her complicated system of tariff walls between States should warn us against establishing virtually the same system indirectly through wide differences in labor laws affecting production costs or in artificial restrictions on the labor market.

The time-worn conflict between State and Federal responsibility was never more critical than in the present gropings for appropriate and effective organizations for unemployment relief. The changing form of our industrial institutions from local to national character may indeed be accompanied by a shifting of some of the duties of government from the State legislatures to the Federal Congress. In this process the experience of Europe with unemployment insurance has less value than is often attributed to it because of basic differences in the conceptions of governmental functions on the two continents.

Meanwhile it should be noted that there are in England more workers covered by supplementary voluntary plans than in all the voluntary plans in the United States in 1930. Compared with workers protected by legislative plans, however, they are of little consequence. When viewed solely from the standpoint of the proportion of unemployed receiving protection, it must be admitted that the compulsory systems are many times more effective than those which rest solely on voluntary action.

Industry Bears Cost of All Systems

The most controversial phase of unemployment relief is cost. It is here that European experience is enlightening. There can be no doubt of the fact that the cost is borne in the end by industry, regardless of the initial assessment on workers, employers and Government. The charge is on production, whether it is levied directly upon the employed workers and their employers, or indirectly through the tax bill of the Government or, we might add, through the voluntary contributions of industry to unemployment charity funds.

The frightening aspect of unemployment insurance is the enormity of the cost when recognized as a unit under a national system. The case of Germany offers a striking illustration of the manner in which a national program can get out of control. The German system has been rendering effective relief for several million workers for three years, but is already being put through reorganization because of the Government's inability to meet the financial demands.

The German system was inaugurated in October, 1927. By April, 1930, the insurance fund had borrowed from the Reich \$370,000,000. In 1930 alone the benefits paid exceeded the income by \$200,000,000, notwithstanding the increase in rate of charges from 3½ per cent of the payroll to 4½ per cent, and later to 6½ per cent. The Reich lately took the situation in hand with a decision to make the system entirely self-supporting and to grant no more subventions after April 1, 1931. At 6½ per cent, the contributions covering 15,000,000 workers will yield \$430,000,000, a sum



sufficient to pay unemployment relief to 2,000,000 persons. This is to be compared with 3,100,000 who received benefits from the Government in 1930, plus an additional 630,000 aided by municipalities. In the present transition period the burden is being shifted heavily to municipalities. In any case, the charge must be absorbed in the cost of production of German goods. The system resolves itself into a gigantic attempt to redistribute the burden of unemployment over all who continue at work, as well as over those whose wages have stopped entirely. It is yet uncertain how this item in the wage cost affects the general level of wage rates.

The cost of unemployment in the United States has always been absorbed without systematic preparation for worker relief. In contrast with this procedure, wise corporations have set up reserves to tide their organizations over business crises. In many cases these reserves insure the continuation of dividends to investors even during years of operating losses. An editorial in *Law and Labor*, published by the League for Industrial Rights, crystallizes this situation with the following concluding statement: "The question which faces the country is whether the worker able, ready and willing to work, having a job which is useful, should be entitled to an equal degree of protection when laid off because the job is temporarily inactive, due to the same vagaries of the business current" (as confront the investor).

This question has been raised for many years in Europe. The answers advanced there have relieved large numbers of families, but have not yet brought stability either to workers or to investors. Remedies have been tried with more or less success, but nowhere has a panacea been discovered.

Score of Unemployment Relief Bills Introduced

Notwithstanding the inborn antipathy of American workers and employers for the social philosophies of Europe, there has long been a considerable tendency in recent years on this side of the Atlantic to adopt methods of State regulation somewhat similar to those of older industrial countries. As already noted, there has been a rising tide of social and labor legislation for several decades. Some of this has been supported by labor groups and some by employers. An example of the latter was the favorable report on accident compensation legislation by the Committee of the National Association of Manufacturers in 1911, after a tour of inspection in European countries which had already had experience with that form of social insurance. Just now the country is experiencing a wave of old age relief legislation. Apropos of today's program, at least a score of States have had introduced in 1931 legislatures bills for the adoption or study of unemployment relief.

Each of these types of legislation has risen out of a specific problem. Economists of a bygone day believed that such social and industrial problems, if left alone, would be solved by the natural forces of competition. The answer to this kind of prayer has been an increasing political control of industry through agencies of the government. The lot of European workers under a system of social classes became so burdensome in the post-war period that political con-

A FEW OF MR. BOWERS' PUNGENT OBSERVATIONS

EMPLOYERS yet have the opportunity to build up a system of unemployment reserves. To the extent that these are successful, public action will become unnecessary or legislation when adopted will follow an industrial pattern.

* * *

The cost of unemployment relief and of maintaining a reserve supply of labor in the last analysis falls upon industry, either through indirect labor costs or taxes.

* * *

Unemployment crises are long established recurrences in industry. There is no reason to expect that they will not continue in the future.

trol was seized in most countries through revolution or the ballot. The result may prove to be good or bad, according to one's rule of measurement, but the lesson which it teaches is that the legislative method is invariably applied where the causes of discontent are not effectively removed through other means. The legislator will undertake to do that which the industrialist fails to do. The choice is a clear one.

The other day a spokesman for an employers' association, in a public discussion of unemployment insur-



Preventive measures may reduce, but cannot be expected to eliminate unemployment.

The history of social legislation in the United States, and especially that relating to unemployment, points unmistakably to some form of unemployment legislation.

Adequate statistics by local communities, by States and for the country as a whole are essential to any organized plan for a balanced distribution of workers and for the alleviation of unemployment.

Organization of the labor market for adjusting supply to demand will not be complete until there is created some agency, logically connected with the public schools, for vocational guidance.

ance said, "If given the opportunity, industry can find a solution to this great problem." A critic might have retorted that industry has had its opportunity and has taken little advantage of it. Between 1916 and 1929, 15 companies, covering a total of 8500 employees, set up experimental plans for unemployment benefits. Trade unions and employers jointly from 1921 to 1929 adopted 14 plans for unemployment benefits which, together with one plan dating from 1894, covered approximately 63,500 workers. Several international unions and at least 40 local unions also have plans affecting some 35,000 workers. All of these plans combined, with the addition of those adopted since 1929, and the relatively few trade-union out-of-work benefit plans, give a limited protection to perhaps 125,000 workers of this country—scarcely "a drop in the bucket."

Public Works and Other Emergency Remedies

Industry has lived through past depressions and seems to be struggling through the present one after a fashion. Great effort has been expended to speed up public works, to make new work and to distribute available work among employees. These steps have greatly mitigated the situation. For the first time in

our history, public works have given some indication of becoming a partial remedy rather than an accompaniment to the causes of unemployment. It constitutes one important means of achieving a balance in our economic system. Let us not be too hopeful, however, of the results. Not only the experience of the United States but that of European countries tells us that we shall be doomed to disappointment if too much reliance is placed upon this way out of our dilemma, as it is not a cure-all for unemployment.

The creation of new work would seem to be the logical solution for unemployment. Many jobs have been "created" lately which otherwise might have gone undone. There have even been examples of retrogression through the substitution of hand workers for machinery, as in a few cases in road building. Further introduction of labor-saving devices has been retarded in order to keep more employees actually on jobs. There need be no time taken here to point out the futility and suicidal results of such steps. Mechanization of industry will go on to produce larger amounts of goods at lower prices for the benefit of an increasing number of people. In the long run the make-work policy will, we hope, be effective through the creation of new industries, but that goal is a distant one and seems only to be achieved through unemployment, at least temporarily, of those thrown out of work by mechanization.

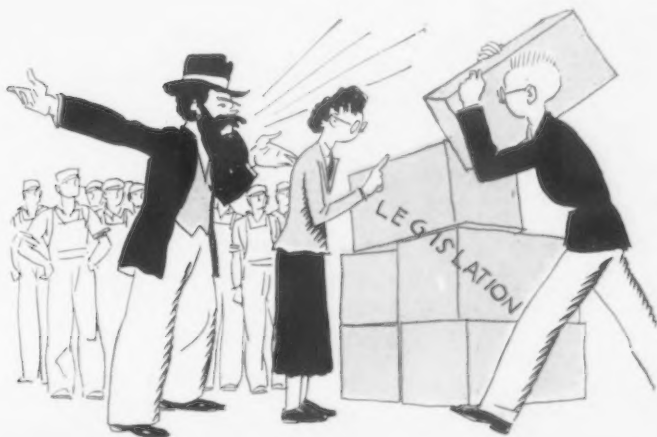
Distribution of work is obviously a temporary makeshift and no one seriously looks upon it as a cure. As to regularization of employment, there is more confusion of thinking. Some experienced observers look upon this as a solution. In the long run regularization where accomplished will be a great boon to industry. In an emergency, however, it merely aggravates the situation by concentrating available work on a relatively smaller stable force of employees who are engaged more weeks of the year as contracted with a larger force which is required only for peak periods. Notwithstanding these admirable and partially effective efforts of recent months, few persons have been bold enough to hope that they will ever remove entirely the hazard of unemployment. They are merely means for relieving it, and the problem will still be with us even after the depression is ended.

Some Kind of Unemployment Insurance Inevitable

Millions of dollars have been contributed by corporations and individuals to the relief of the unemployed. Probably there has never been a piece-time crisis in which the citizens of this country have poured out their personal and corporate contributions for public charity as generously as in the present one. Demands for relief have been unprecedented. Most community funds are already getting low and some have been exhausted. Meanwhile, the public treasuries have been opened in several cities and the "dole" in its most vicious form has been inaugurated as an alternative to further distress for the unemployed or to new drives for private charity. The resort to public treasuries in one winter leads to further drafts in the next and before we realize it, industry by its own inaction will be deprived of the opportunity to work out its own solutions.

(Concluded on page 2078)

The Iron Age, June 25, 1931—2035



ELEVATOR GUIDES MACHINED ON BOTH STROKES OF PLANER



TWO rocker tool heads that permit cuts being taken both on the forward stroke and the return stroke of a planer table have been fitted to a G. A. Gray Co., 18-ft. planer in the shop of the Thomas F. Kelly Co., Waukegan, Ill. This arrangement, which has been in use for a number of years, has been found to give a smoother job than two tools mounted tandem in the same tool block. It is used to plane the two sides and the top of elevator guide tees which form the track for passenger and freight elevators.

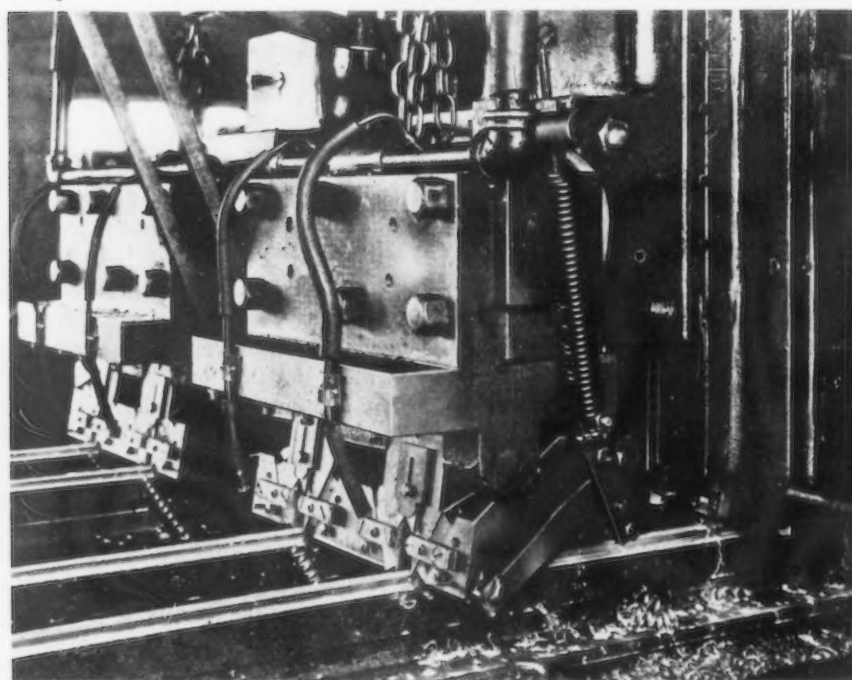
No Change in Table Travel Speeds

The planer table is fitted at close intervals with clamps by means of which the rails are held in place. These clamps also serve the purpose of bringing the rails into true alinement so that equal amounts of metal will be removed from each side of the rail. The set-up is accomplished by means of gages temporarily attached to the heads. No changes have

been made in the speeds of travel of the planer table.

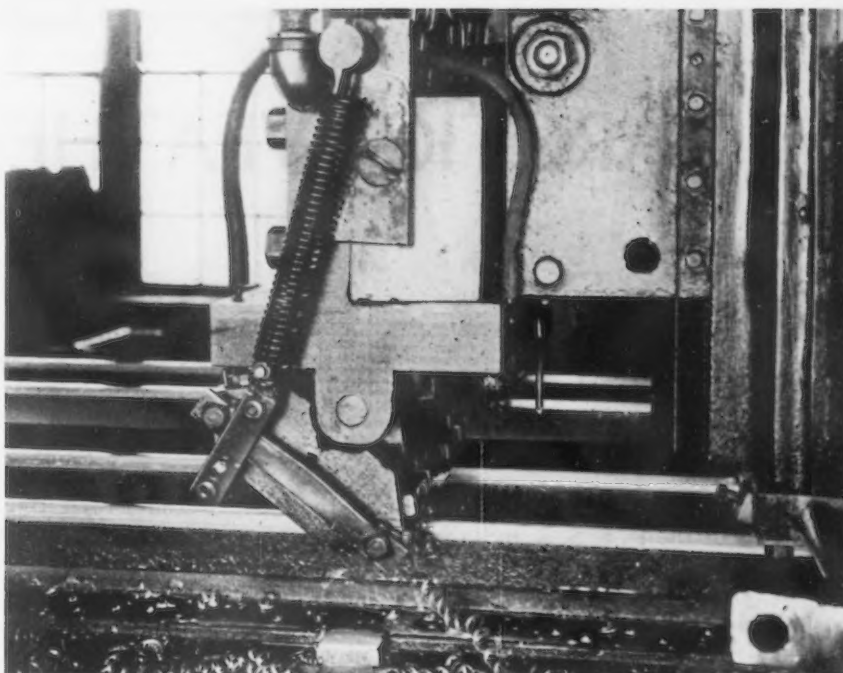
Each rocker head holds the tools for two rails: two roughing tools, two finishing tools and two corner breakers, for each rail, 12 tools in all.

When cutting operations are started the rocker heads are tipped forward so that the roughing tools, which are mounted in the outside face of the head, are in position to take the roughing cut as the planer table moves forward. As the table reverses a tripper tips the counterweighted rocker heads backward, thereby lifting the roughing tools and bringing the finishing tools into cutting position. The finishing cut is made at the return speed of the planer. The feed of both roughing and finishing cuts must of necessity be the same, because the finishing tool trails after the roughing tool. This cycle is repeated until the sides are planed to the required depth. The roughing tool takes off 1/16 in. or more depending on the tolerances held in rolling the sections, while the finishing tool removes from 0.003 to 0.004 in.



EACH rocker head holds 12 tools; four roughing tools (the cut being taken in the illustration), four finishing tools and four corner breakers. Independent tools, located back of the rocker heads, plane the tops of the rails.

THE finishing cut is taken on the return travel of the planer bed. The speed has not been altered from that set by the planer manufacturer.



The corner breakers do not come into action until the side cut is finished. While the sides are being planed, four independently mounted tools, one for each rail, are fed across the tops of the rails. These tools cut only with the roughing cut. They are

equipped with a lifting mechanism so that they will not drag on the return travel. Depth of cut depends on rolling tolerances and feed may be varied at will.

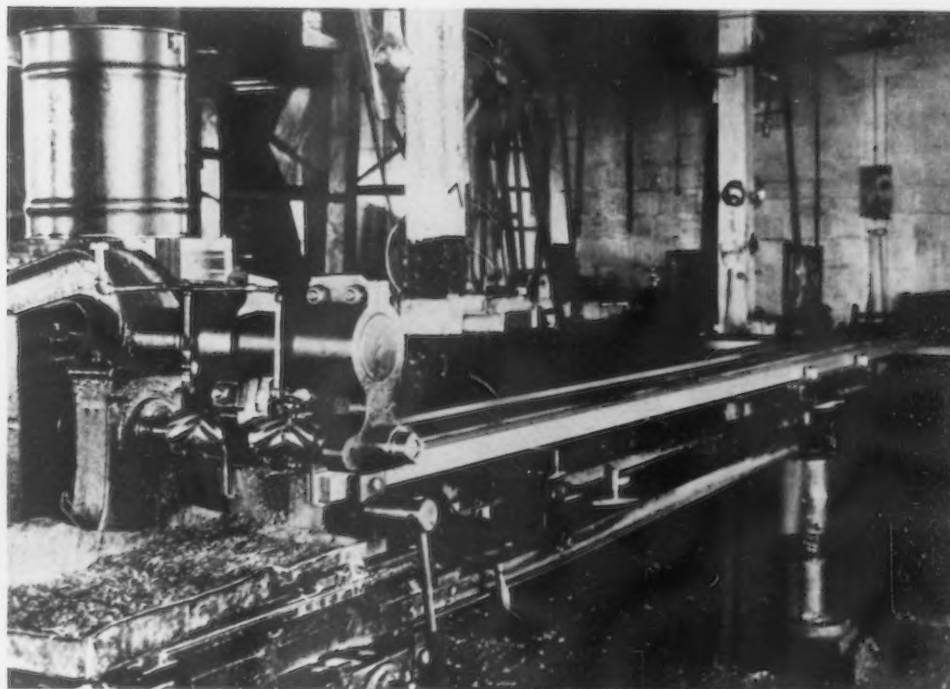
Tool bits for the rocker heads are all



made from $\frac{3}{4}$ -in. square bar stock, ground to standard angles except for small variations made necessary because of slight inaccuracy in the angles of the tool slots. Each tool is dropped into its slot where it is held by a cross bar. Set-screws in the head hold the tools against the face of the slot.

Another interesting device in use in this shop is a small turntable on which two rails are mounted preparatory to milling a tongue in the end of one rail and a groove in the end of the other. When this operation is completed the turntable is swung through 180 deg., giving the effect of reversing the rails so that each rail has a tongue on one end and a groove in the other. This device also saves much time and labor.

A MILLING machine cuts a groove in the end of one rail and a tongue on the end of a second rail. The rails are mounted on a turn-table which is swung through 180 deg. so that each rail is cut with a tongue on one end and a groove on the other end.



ARCTIC WEATHER FAILS TO

By C. G. BIGELOW

Construction engineer, Freyn Engineering Co., Chicago

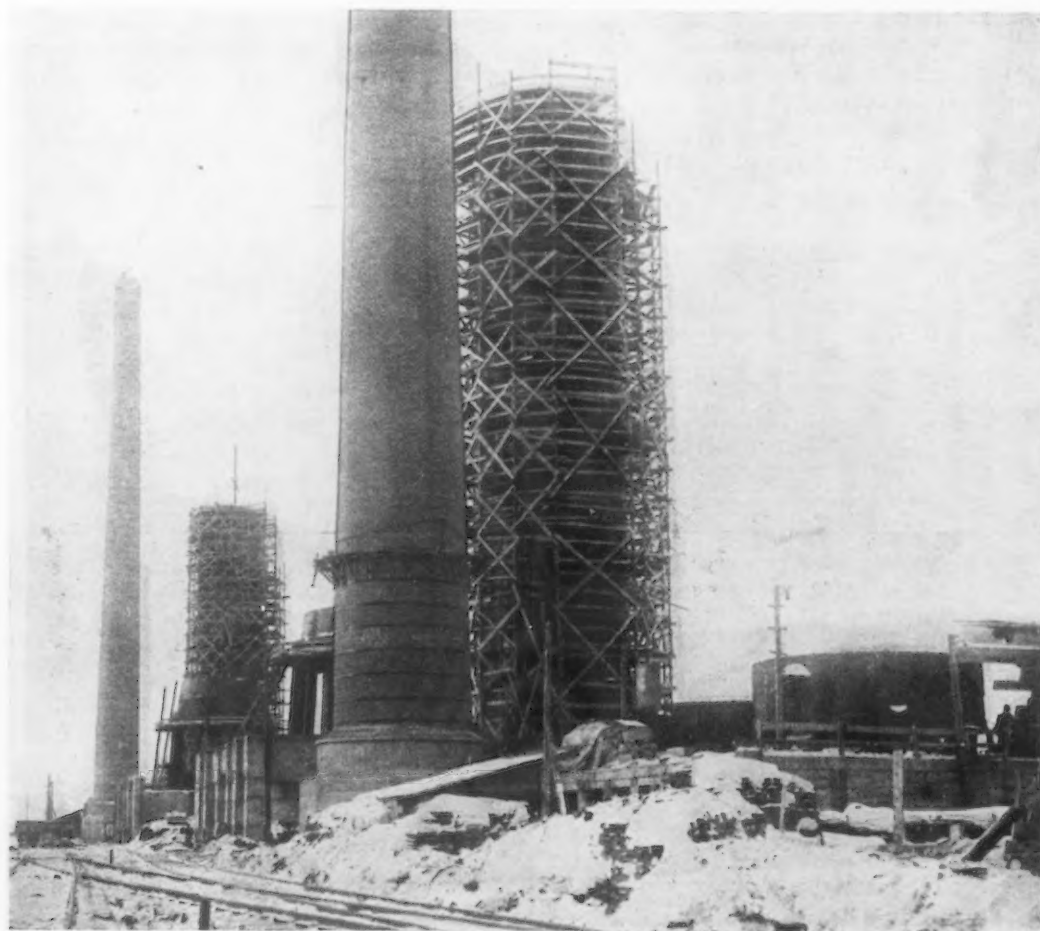
INCREASED steel production is one of the basic needs of the U. S. S. R. in its industrial development program. Besides bending its efforts to increase the output of existing plants, Soviet Russia has undertaken the construction of several completely new units, all of which are planned along the most modern lines. After a thorough survey of the steel-making methods in use throughout the world, the Soviet Government was so favorably impressed with large-scale production and advanced labor-saving methods as developed in the United States, that it decided its new plants should be built in accordance with American practice.

One of the largest of the new plants is the Kuznetsk project, which was originally planned by

the Freyn Engineering Co., Chicago, and which is now being constructed, along modified lines, under its supervision.

This plant is located near the town of Kuznetsk on the Tom River, in the heart of the Telbes mineral region. This district lies in the foothills of the Great Altai Mountains, in Siberia, 270 miles south of Tomsk. It is about 2700 miles east of Moscow and is reached by a spur railroad line leaving the Trans-Siberian Railroad at Novo-Sibirsk.

The Telbes district is rich in iron ores, coal, both steam and coking, limestone and the raw materials for making fire and silica brick, as well as cement. It is, therefore, quite self-contained from the standpoint of producing iron and steel products.



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CONSTRUCTION of two of the four blast furnaces was well advanced by the end of February. This view, in December, shows two stoves pretty well up.
▼ ▼ ▼

RETARD

SIBERIAN STEEL PROGRAM

The metallurgical value of this district was recognized prior to the revolution and plans were even then under way for its development.

The site chosen for the plant is such that the longest haul for raw materials is about 75 miles. However, for the initial development, ore will be brought from Magnitogorsk, in the Ural Mountains. Except for its rigorous climate, the average for the year being 1 deg. C., with an extreme of 56 deg. C. below zero, the location is well suited economically to give the plant a major rôle in developing the tremendous resources of Asiatic Russia. As a factor in international trade, its effect will be negligible, considering the handicap of thousands of miles of transportation to seaboard.

The completed project will include four batteries of coke ovens with full by-product recovery, four blast furnaces with a daily output of 3500 tons, fifteen 150-ton open-hearth furnaces, blooming mills, rail and structural mill, plate mill, billet mills, merchant mills, and other finishing mills.

There will also be provided a central electric power-generating plant with an ultimate capacity of 96,000 kw., a pump house, brick plant, foundry, ma-

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VAST distances to sources of supplies, lack of local industrial development and sub-zero weather are among the many obstacles which had to be overcome in building a new Russian steel plant, to have an annual output of 1,200,000 tons of pig iron and 1,450,000 tons of steel ingots.

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chine shop, boiler shop, forge shop and other shops. A complete modern town is being constructed, to have a population of 50,000. The estimated cost of the undertaking is \$250,000,000.

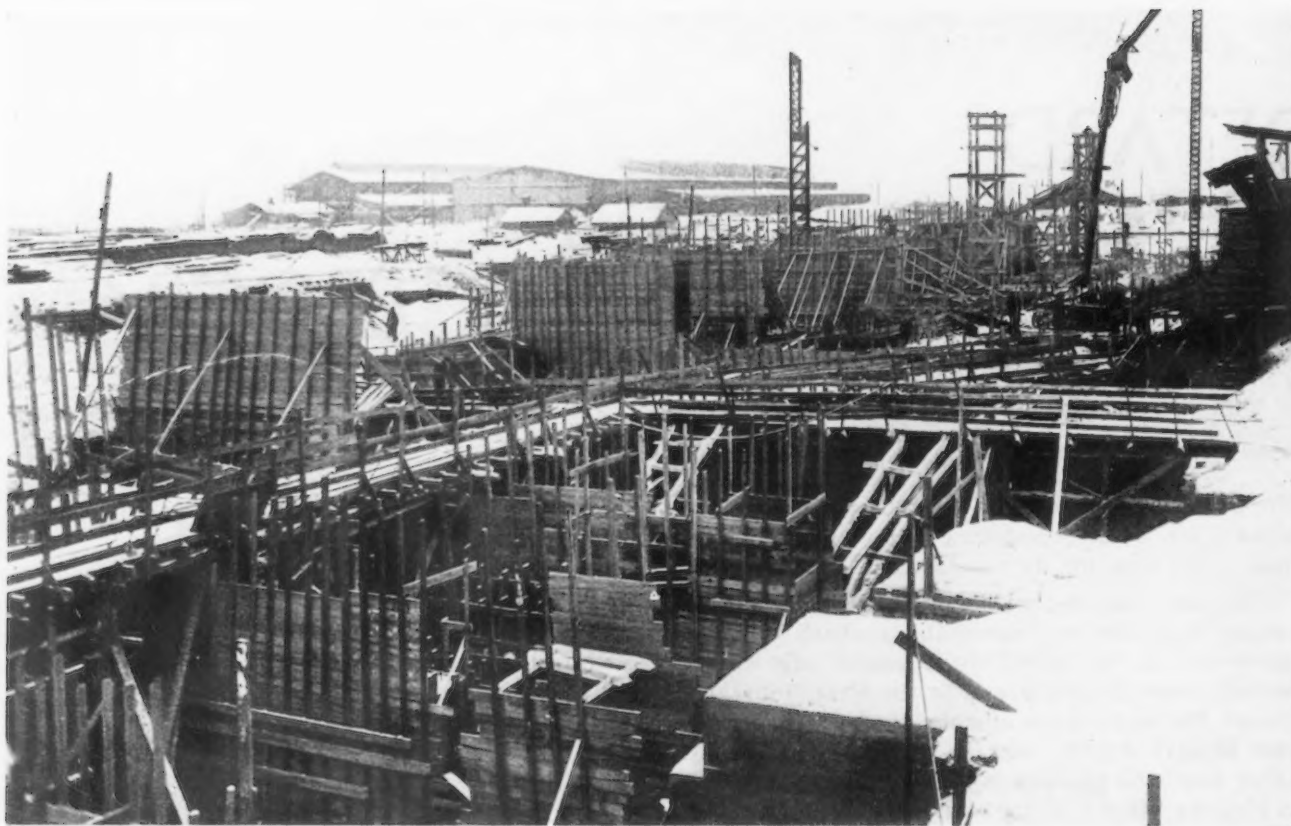
The ultimate annual production set-up, in metric tons, is as follows:

Pig iron	1,200,000
Steel ingots (80 per cent hot metal)	1,450,000
Rolled steel products	1,130,000

The schedule of construction calls for tapping the first iron the latter part of this year. Approxi-

▲ ▲ ▲
STRUCTURAL
steel and plate
work for the open-
hearth building were
fabricated in South
Russia.





About 25,000 cu. yd. of concrete has been poured in the open-hearth department in temperatures that range downward to 40 deg. C. below zero.

mately half of the ultimate capacity is now in construction, and is from 30 to 40 per cent complete. Although it is scarcely a year since construction work was actively undertaken, the magnitude of the work already accomplished is great. Considering the vast distances to the sources of supply, the lack of any preliminary industrial development in the district, and the handicap of the cold climate, the energy with which this project is being pushed is outstanding.

The illustrations will give some idea of the work accomplished at the time the photographs were taken, early in December, 1930. One view shows the blast furnace plant with two stoves under erection and the two furnaces up to the mantles. By Feb. 15, however, the two furnace shells, including the domes, had been erected and riveted, four stoves had been completely assembled and riveted, while the other four stoves were in various stages of erection.

Concrete Poured at Far Below Zero

Another illustration shows the open-hearth foundation work, with some of the shops in the background, while a third shows progress on the general power plant. About 4000 cu. yd. of concrete has been poured in the power plant and about 25,000 cu. yd. in the open-hearth department. Steel is being erected in the open-hearth department and brick is being laid in two of the 150-ton open-hearth furnaces. Many of the shops, including machine shop, bridge shop, forge shop, pattern shop and carpenter shop, have been completed and use is being made of them in the completion of the main departments. The steel foundry building is now being erected and

the fire and silica brick plants will be in operation this spring.

Probably the outstanding achievement of the field construction organization has been the pouring of many thousands of yards of concrete at sub-zero temperatures. Since the first of December the temperature has been below freezing. From Dec. 15 to Dec. 20 the temperature ranged from 35 to 56 deg. C. below zero (31 to 69 deg. F. below zero). However, concrete has been poured regularly, even when the thermometer registered 40 deg. C. (40 deg. F., also) below. The ground has been kept free of frost by the use of salamanders. Sand, gravel and water all are heated and the concrete is poured at a temperature of 80 to 100 deg. F. It is then covered with felt and surrounded with salamanders. Thermometers are placed in the concrete and the temperature held well above freezing for at least 28 days. In this way thousands of yards of sound concrete have been poured during the winter months. In spite of the extreme cold, the workmen, dressed in heavy clothing, do not suffer, as there is very little wind and the air is very dry.

Much Machinery Had to Be Imported

Every effort is being made by the Soviet authorities to provide the American engineers and their families with comfortable and convenient living facilities, to enable them to carry on their work with the best results. In addition to the exclusive use of a large hotel, 12 apartments have been provided, with complete modern furnishings. Playground and recreation facilities have been provided, also.

To expedite the construction of the plant in mini-

mum time, a great deal of the equipment has been purchased outside the Soviet Union. While the Russians were fabricating the structural steel and plate work in South Russia, mechanical parts for the furnaces were purchased in the United States. Blooming mills, rail and structural mill, plate mill, and some of the larger merchant mills were purchased in Germany. English and German firms are furnishing the main mill drives, generating and switching equipment, while the turbo-blowers are coming from Switzerland. Auxiliary motors and control are being manufactured in Russia.

Some incredulity has been expressed as to how such a gigantic construction job could be carried on so rapidly in the face of such great difficulties. The remarkable progress to date is evidence of the tremendous energy the Soviet Government has placed behind this enterprise, which is the first complete project in the steel industry to be undertaken with complete American consultation and direction.

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Radiography Useful in the Foundry

RADIOGRAPHY is a ready and useful tool in the foundry for examining castings with a view to studying conditions that lead to defects and avoid-

ing their repetition, according to C. W. Briggs, who read a paper at one of the steel sessions at the recent convention of the American Foundrymen's Association. The paper on the subject of detecting casting defects by radiography using gamma rays was prepared by Mr. Briggs and R. A. Gezelius, both of the Naval Research Laboratory, Washington.

Surface defects in steel castings have been largely eliminated, said Mr. Briggs, and the principal defects now are contraction, cracks and porosity. The torch and hack saw were used for the most part in the past, but a better method of detecting internal defects is the use of X-rays and gamma rays. The principal difference between the two is that the gamma wave length is much shorter. Gamma rays penetrate the metal much more deeply. The practical penetration limits of X-rays is about 3½ in., but gamma rays will successfully penetrate up to 10 in.

The speaker showed a number of interesting lantern slides of gamma ray radiographs of a welded stern post casting, used in the construction of a Government cruiser, in which serious cracks were revealed after its installation. In this case eight radiographs were taken simultaneously. Another series of lantern slides of gamma ray pictures showed a keel knuckle casting.

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SITUATED 2700 miles east of Moscow, the Kuznetsk plant is in the heart of Asia, continent of magnificent distances.



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RUSSIAN steel works (below) in construction. At left are two blast furnaces and at right is an electric generating station. In foreground is the "most reliable mode of transportation."



LEAD PATENTING EQUIPMENT

By C. B. PHILLIPS

Vice-president, Surface Combustion Co., Toledo, Ohio

DIES are the critical points in the manufacture of wire, while the strength and endurance of the wire depend upon the heat treatment given it. Dies of iron, steel, alloys and diamonds are used, with varying results. Most wire makers are still experimenting with the newer alloys, with a view to attaining increased tonnages with decreased die costs.

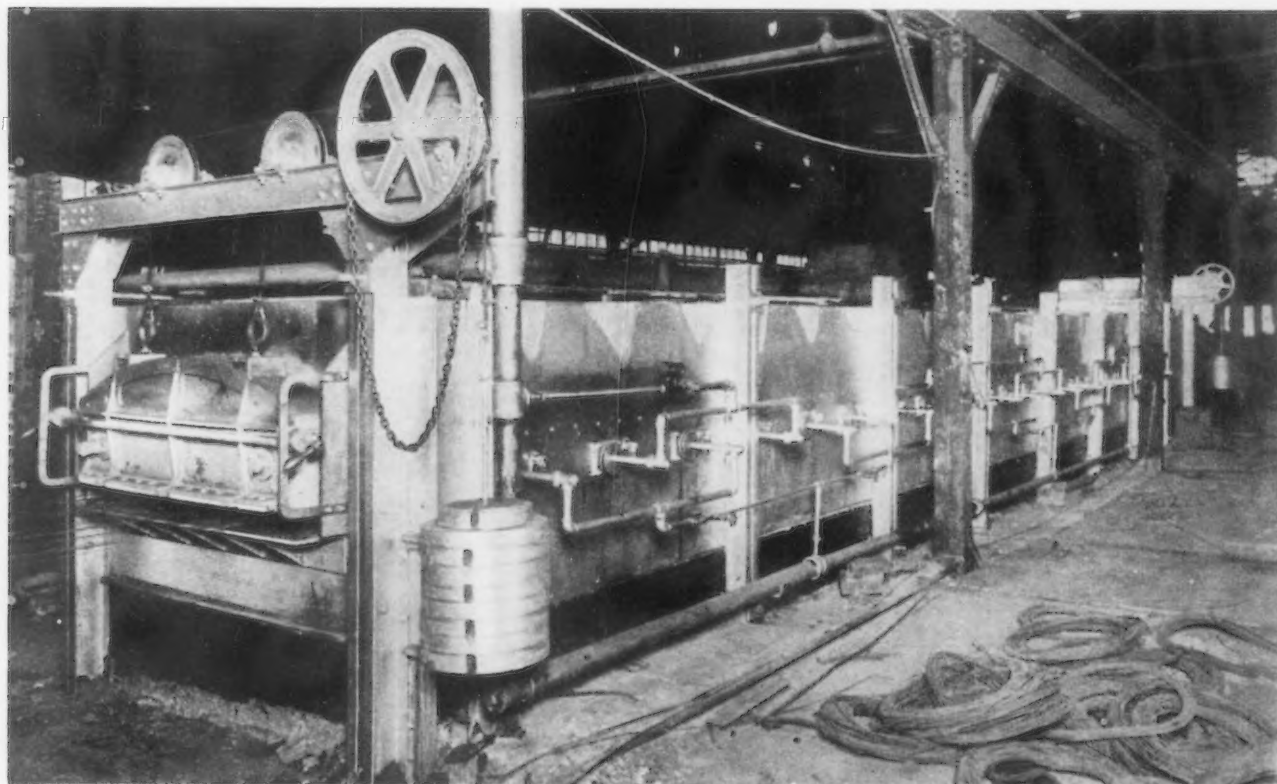
Results obtained from much experimentation carried on at the plant of the Union Wire Rope Co., Kansas City, are interesting. This company manufactures high-carbon wire and wire rope for many industrial purposes, including logging, the oil industry, etc. From raw material in the form of steel rods, wires are drawn of diameters from 0.014 to 0.148 in. Dies of chilled cast iron are commonly

used here, with die weights as follows: Two and a half pounds for wires running up to 0.043 in., 5 lb. for those between 0.043 and 0.080 in., and 7½ lb. for those above 0.080 in. in diameter. The dies are made in the company's own tool and die division.

Dies of alloys in the tungsten-carbide series have been tried out recently at this plant. So far, however, the increase in tonnage pulled has not offset the greater die costs in any of the sizes experimented with. These alloys are practically the same as are being used for cutting and turning tools, with the addition of one or two other alloying metals. A far different result, however, has been obtained by makers of soft basic wire, where these alloy dies are being used successfully.

Most of the plant is housed in a long, narrow

PATENTING furnace 60 ft. long, showing wire entering at left in about 30 strands. Burners located along the side are adjusted through pyrometric control. ▲ ▲ ▲



IS FEATURE OF WIRE PLANT

PATENTING of wire is a regularly established practice in connection with drawing it. It is necessary in removing the strains set up by the operation of drawing. A well designed outfit for this purpose is here described, showing methods of heating the furnace and of handling wire through the furnace.

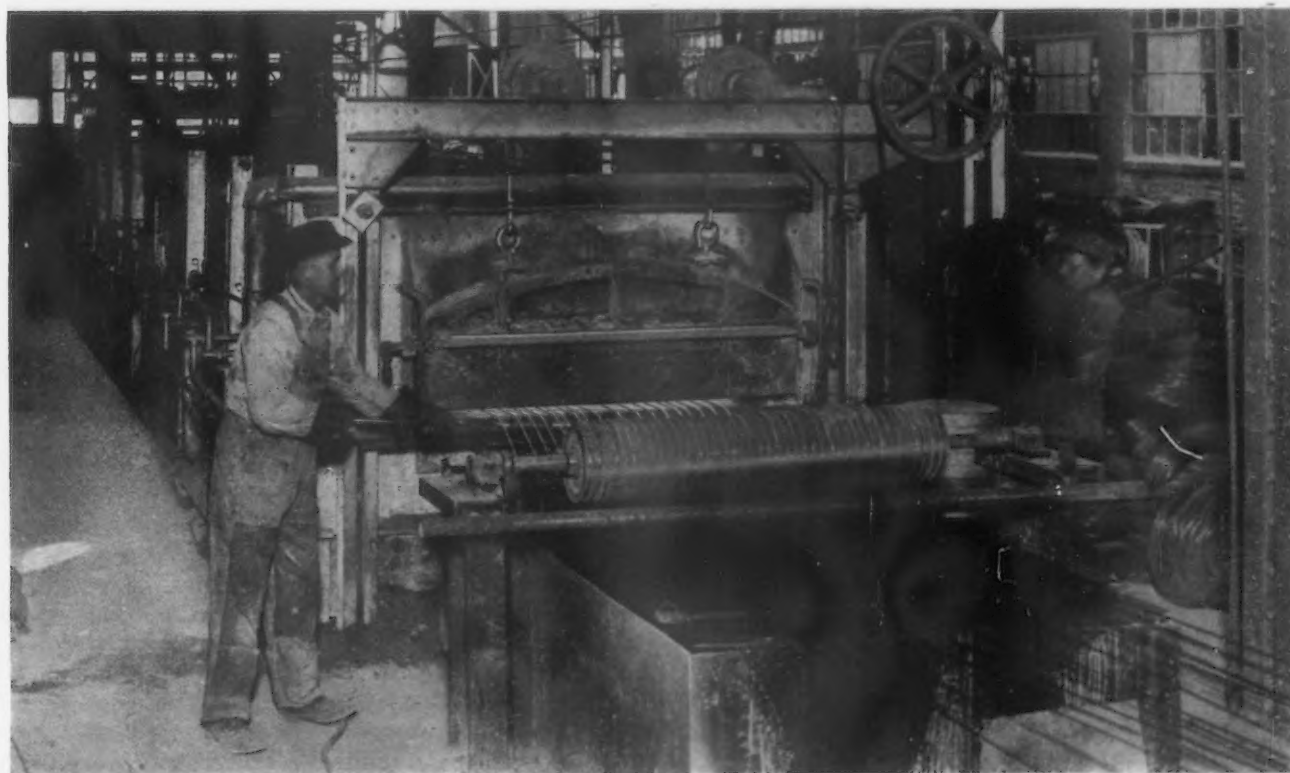
building, with long rows of benches arranged in lines with aisles between. These benches range in length from 50 to 80 ft., are 4 ft. wide and 3 ft. high. The bench tops are of steel and the dies, set in blocks, are fastened at intervals along the edges. Wires or rod, wound in coils on swifts, which set on the floor, are threaded through the dies. They are then pulled through and coiled up on motor-driven blocks which set in a row along the center of the bench. One motor and one drive shaft serve to operate an entire bench of blocks.

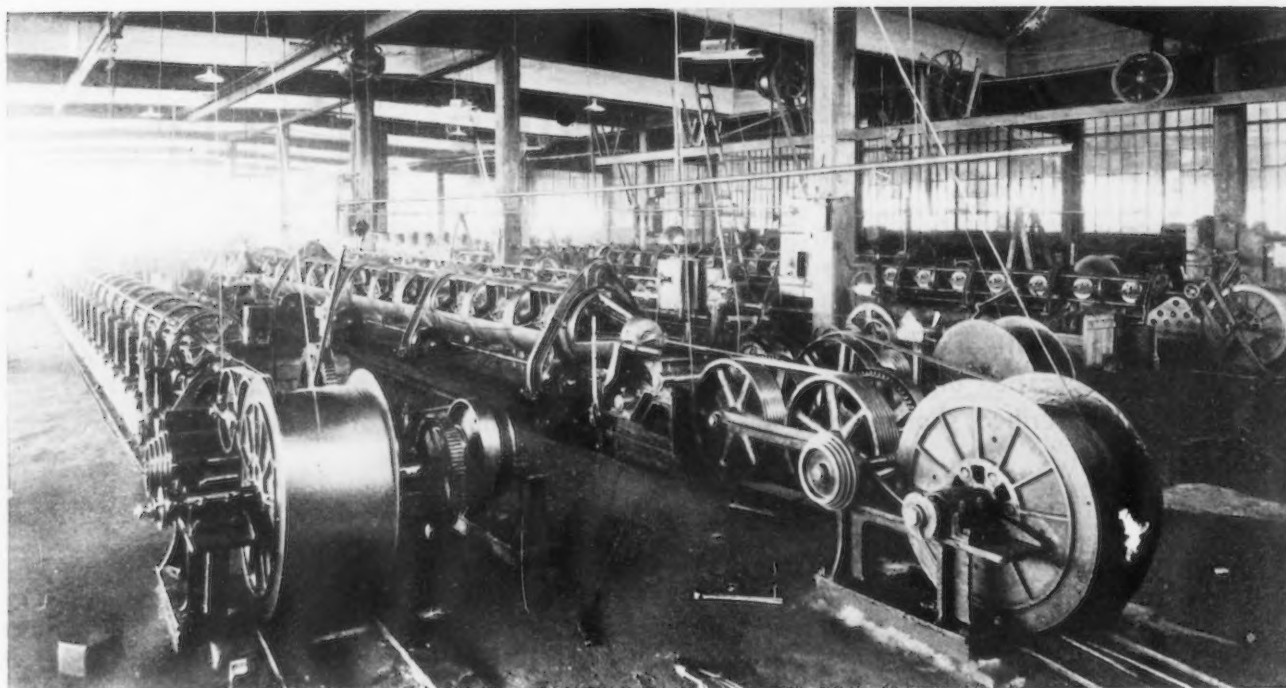
When a wire has been thus pulled, the loaded block is transferred, as a swift, to the next smaller size die, and so on until the desired diameter has been reached.

Raw material in the form of coiled rods and finished storage are in a separate building, 125 x 350 ft., through which a spur railroad track runs, all commanded by a traveling bridge crane of 15 tons. The rods are first pickled, using equipment at one end of the building. This consists of a series of vats arranged in a circle with a swing post crane and hoist in the center. The vats contain dilute sulphuric acid, water, water under pressure, scull coating and lime coating; the coils are put through these in turn.

The lime is baked on, in bake ovens, of which there are three. Each oven is 42 ft. long, 20 ft. wide, and 6 ft. high, is built of sheet steel and heavily insulated. On top of the oven is a separate air

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EXIT of patenting furnace, showing in foreground the lead bath. Wire which is to be air patented passes above the lead without entering it.





Stranding machines for making wire rope. Each is provided with automatic take-up, the rope being wound on a reel as fast as it is finished.

heater, constructed of steel and insulated, and at one end are three gas burners which fire directly into it. At the other end, a motor-driven fan exhausts the heated air and forces it into a pipe which carries it to four ducts, laid on the oven floor. These distribute the hot air uniformly throughout the oven.

Removing Drawing Strains

Strains set up in the wire during the operation of drawing must be removed by heating or patenting. For this purpose a patenting furnace, designed and built by the Surface Combustion Co., Toledo, Ohio, is used. Of brick construction, this furnace is incased in steel; it is 60 ft. long, 6 ft. wide and 4½ ft. high. It is designed so that either air patenting or lead patenting can be used, or both together. The lead bath is outside of the furnace, at the discharge end, and is held in a steel tank 8 ft. long, 4 ft. wide and 3 ft. deep. One big burner under this tank, using gas from the Kansas City Gas Co., serves to keep the lead in a molten condition.

There are 40 gas burners, 20 on each side, for the long, patenting furnace, firing just above the hearth. Gas is raised to 25 lb. pressure in a compressor; and inspirators, of the automatic proportioning type, are used with the burners. With this equipment, the gas and air can be proportioned with a single valve, for any desired furnace atmosphere.

Pyrometric control is employed to maintain automatically the correct temperature in this furnace. An expanding element, set in the top of the furnace, actuates an on-and-off valve in the gas supply line. This valve, however, has a small by-pass so that the burners are kept lighted until the temperature has dropped sufficiently to cause the valve to be reopened. A chart of the temperature fluctuations is kept with a recording pyrometer.

At the charging end are 30 swifts and a corre-

sponding number of blocks are at the discharge end, set in two long rows. Thus 30 wires are drawn through the furnace at a time, the blocks being motor driven through a single shaft and speed-reduction gear train. All wires are air patented and the higher grades are also lead patented. When using the former process only, the wires travel straight out of the furnace and pass over the lead bath. When both processes are desired, a bar is laid over the wires and they are pressed down so that they run through the molten lead.

Coils Given Tension and Torsion Tests

Air patenting temperatures vary from 1650 to 1700 deg. F., depending upon the quality and size of wire and the work for which it is intended. The heating periods are variable, but, after the wires are properly treated, the grain structure is as nearly sorbitic as it is possible to get it. The lead bath is carried at about 700 deg. F. minimum, and is equipped with a recording pyrometer. It is necessary to patent some rods before they are drawn; others have to be patented after two draws, and then they are good for four, five or six more draws.

Every coil of wire is given tension and torsional tests and some grades are given also bending and fatigue tests. Tensions run from 150,000 to 300,000 lb. to the square inch, according to grades, with 2 or 3 per cent elongation and 45 to 55 per cent reduction of area.

In the rope department are three lineups, each including spooling, stranding and closing setups. First come the batteries of spoolers, where the wire is unwound from coils and rewound on steel spools. These spools are then put into the stranding machines. Ropes containing 7, 19, 25 and 37 wires are formed, and then these are closed, in closing machines, both vertical and horizontal types being used.

PHYSICAL PROPERTIES OBTAINABLE IN HOT-ROLLED SEAMLESS TUBES



GREAT variations in choice of steel analysis and physical properties are available with seamless tubes. How these may be taken advantage of was discussed in a paper by George P. McNiff*, National Tube Co., read before the Western Metal Congress. Carbon and manganese may be higher and rustless alloys used. The author cautions against leaning too heavily on anti-corrosion coatings.

*In THE IRON AGE of June 11, page 1995, the first article of this series was erroneously credited to Dr. F. N. Speller, also of the National Tube Co.

OUTSTANDING differences between seamless tubes and tubes produced by other methods of manufacture are several. First is the fact that the seamless tube is without seam or weld at any point, thus assuring a product of homogeneous section throughout. Second is the fact that none of the other processes now used permit the variation in choice of analyses and physical properties of material that this one does. In general, the welded processes, such as the lap and butt, are almost completely confined to low-carbon material in the range of 0.08 to 0.12 per cent carbon. The later electric welding processes have permitted in some cases the choice of analyses with carbons running as high as 0.30 per cent and slightly above.

In the seamless process no such restrictions exist and today material is being fabricated into seamless tubing with carbon content ranging from 0.10 to 0.60 per cent and even 0.70 per cent. In addition to this, a large range of alloys is now available, not only the usual S.A.E. steels but also the stainless steels, which are capable of being made into tubing by this method. Considerable quantities of 18 per cent chromium and 8 per cent nickel, as well as some of the intermediate grades of chromium content, going as low as 4 to 6 per cent chromium, are being quite widely used in tubes for the oil cracking and refinery processes.

For the same carbon content or analysis, the physical properties of tubular material will correspond with those of equivalent solid sections. The only variable of any degree which alters this comparison is that due to the fact that the inside diameter permits a circulation of air, and thus a faster cooling, than can be obtained on the solid section.

As might be expected, a direct measure of this variable can be found by taking the wall thickness

into consideration. In this connection, the diagram shows the effect of wall thickness on the physical properties. This diagram shows the relation of increasing wall thickness plotted against the percentage change in tensile strength and yield point. The physical properties for each wall thickness are referred to $\frac{1}{8}$ -in. wall as 100 per cent. It is not generally realized that this matter of wall thickness is of considerable importance in determining the tensile properties of a tube of given composition. If it is realized, however, that a range of wall thicknesses from $\frac{1}{8}$ in. to $\frac{3}{4}$ in. is not at all uncommon, and that such a range bears a very similar relation to a range in bar stock of from 1 in. to 5 in. in diameter, this question of variation in physical properties can be better appreciated.

From the diagram it is seen that the effect on tensile strength of a given change in wall thickness is greater for the light walls, and becomes proportionally less effective as the walls approach the heavier sizes. This same tendency is shown with respect to the yield point, but the change is much greater than in the tensile strength. This is borne out by general experience in heat treatment and annealing, the heat treatment increasing the elastic ratio very greatly and the annealing decreasing the ratio. The thin-walled tube can be considered as having had an air quench with respect to the slower cooling, or annealing, of the heavier wall section.

Considerable Choice of Qualities Possible

WHILE such hot-finished material does not permit the choice of physical properties that can be obtained in cold-drawn material, some idea may be given as to the physical qualities which can be obtained from hot-rolled tubes. As has been shown, the physical properties for hot-finished material will

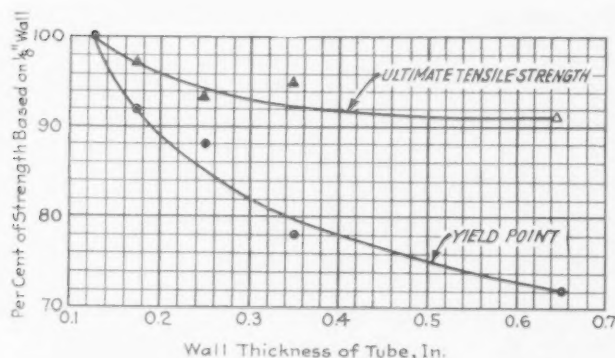
vary to a certain extent, depending upon the tubular section. However, eliminating this variable and taking a normal sized tube, the following physical properties will obtain for the analysis given:

Carbon 0.10 to 0.20 per cent, conforming to S.A.E. 1015, in the "as rolled" condition, will have an average ultimate strength of 55,000 lb. to the square inch, a yield point of 35,000 lb., and an elongation in 2 in. of 40 per cent.

Carbon 0.20 to 0.30 per cent, or S.A.E. 1025, will have an ultimate strength of approximately 60,000 lb., a yield point of 37,000 lb., and an elongation in 2 in. of 35 per cent.

With S.A.E. 1025, or 0.30 to 0.40 per cent carbon, an ultimate strength of 70,000 lb., a yield point of 40,000 lb., and an elongation in 2 in. of 30 per cent, can be met.

These carbon contents do not furnish the maximum physicals desirable for some uses, such as line



EFFECT on tensile strength and yield point of increasing the wall thickness of hot-rolled seamless steel tubes. Unity or 100 per cent represents the quality of tubes with $\frac{1}{8}$ -in. wall thickness, the average physical properties of which are given as 77,000 lb. tensile strength, 50,000 lb. yield point, 44 per cent elongation in 2 in. and 35 per cent reduction of area. This is for steel of 0.30 to 0.40 per cent carbon, 0.40 to 0.65 per cent manganese, under 0.045 per cent sulphur and under 0.04 per cent phosphorous.

pipe. It was found expedient, to eliminate any of the detrimental effects of carbon on the welding properties and also maintain a maximum of ductility in the material, to obtain the desired tensile strength by the substitution of manganese for the carbon. With this combination a range of physical properties without any detrimental effects on the welding can be readily obtained.

For example, by the judicious use of manganese, the physical properties of S.A.E. 1030 can be obtained with a carbon content of approximately 0.20 per cent. A definite increase in the manganese content with only a slight increase in carbon permits furnishing material with tensile strength averaging in the neighborhood of 70,000 to 80,000 lb. to the square inch. At present the manufacturer does not recommend the use of higher carbon content than 0.35 per cent when welding is to be used as a medium for making joints. However, as the ability to weld higher-carbon material is developed, it will be possible to manufacture material with much higher tensile strength, as is now the case with

drill pipe and casing, where tensile strengths of 95,000 to 100,000 lb. are being regularly produced.

Development and availability of such material with high physical properties has created a situation of which cognizance must be taken shortly if the benefits which are derived from the use of such material are to be retained. That is the tendency to decrease the thickness of the pipe and depend upon the higher tensile strength for service. This, in our opinion, is dangerous, as the resistance to oxidation or corrosion is more or less a function of the wall thickness. Undoubtedly the next few years will find considerable replacements being made in a number of the very-light-wall lines which have been laid.

There is, of course, the answer to this that coating will take care of such a condition. However, to our knowledge, there has not been developed a coating of sufficient permanence and efficiency to overcome this condition. And we believe this contention is borne out when it is remembered that practically all those interested are now searching for a permanent and efficient coating. We believe that the permanence of a line is going to depend considerably upon the thickness of the pipe used, and engineers in designing such lines cannot expend too much thought on what that thickness shall be.

Alloy Steels Have Allurement

PASSING on to some of the alloy steels, some of the physical properties to be obtained from them, with reference particularly to the "stainless" variety, may be given. The steel most generally being used at present in anti-corrosion work around oil refineries is 18 per cent chromium and 8 per cent nickel, with a very low carbon content. This material as furnished, heat treated, will have approximately the following physical properties:

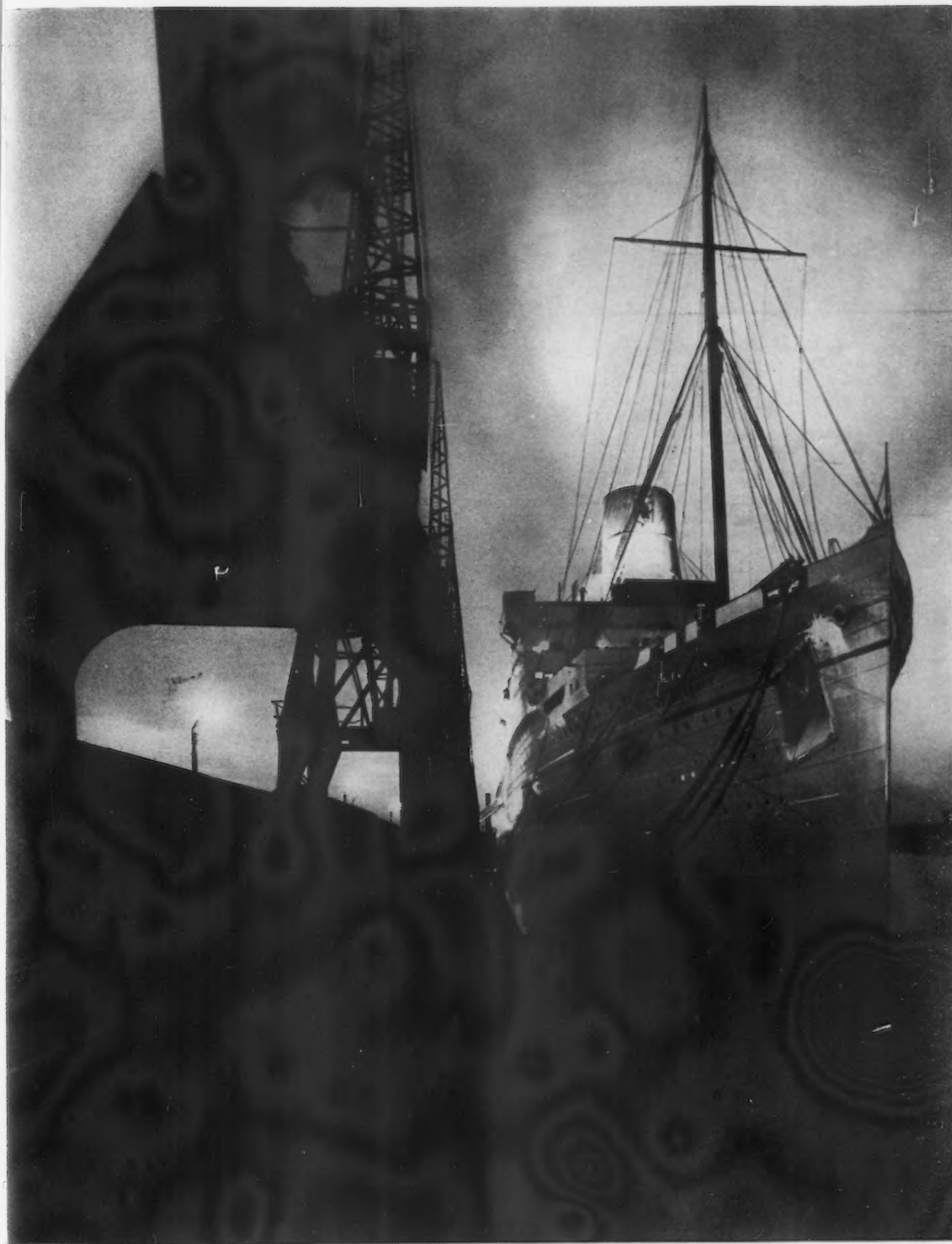
Ultimate strength, 85,000 lb. to the square inch.
Yield point, 35,000 lb. to the square inch.
Elongation in 2 in., 50 per cent.

Being austenitic, this steel possesses some very valuable properties, which, in spite of its high tensile value, permits fabrication cold to almost the same extent as a mild-carbon steel. However, the increased tensile strength, of course, requires additional power for manipulation, over the mild-carbon steel. The particular properties of this material which recommend it most readily to the oil cracking industry are:

1. Its resistance to corrosion.
2. Its resistance to oxidation.
3. Its increased strength at high temperatures.

Increase in strength at high temperatures is readily shown by referring to creep tests. These indicate that this material has a creep value of about 14,000 to 15,000 lb. to the square inch at 1000 deg. F., against about 3000 lb. at the same temperature for mild-carbon steel, based on an elongation of 1 per cent in 100,000 hr. So far, this is the only analysis of the stainless variety that has shown it-

(Concluded on page 2097)



A SHIP IN THE NIGHT



THE mystery of the sea and the majesty of modern machinery are embodied in this photographic study of the new transatlantic steamship, Empress of Britain, alongside a huge wharfside gantry crane at the docks at Southampton, England. The ship is a new addition to the Canadian Pacific line, and recently sailed on her maiden trip.

The Iron Age, June 25, 1931—2047

HIGH-GRADE ALUMINUM FROM SCRAP IN

ALUMINUM contained in the waste products of industries that use that material is smelted, purified and alloyed in specially designed continuous furnaces and made directly into castings in sand and permanent molds by the National Bronze & Aluminum Foundry Co., Cleveland. The metal produced is claimed to have physical properties equal to those of aluminum made from virgin metal that is alloyed and melted by standard methods, thus rendering available to industry a large and continually increasing quantity of salvaged material. With these furnaces aluminum is salvaged from any kind of material, such as drosses, skimmings, borings and grindings, aluminum ashes and aluminum foil. In the process no prime metal, remelted aluminum or scrap is used, and consequently a marked saving in cost is claimed.

Starting the use of the process commercially over two years ago with one melting furnace, the company recently built a second furnace, which

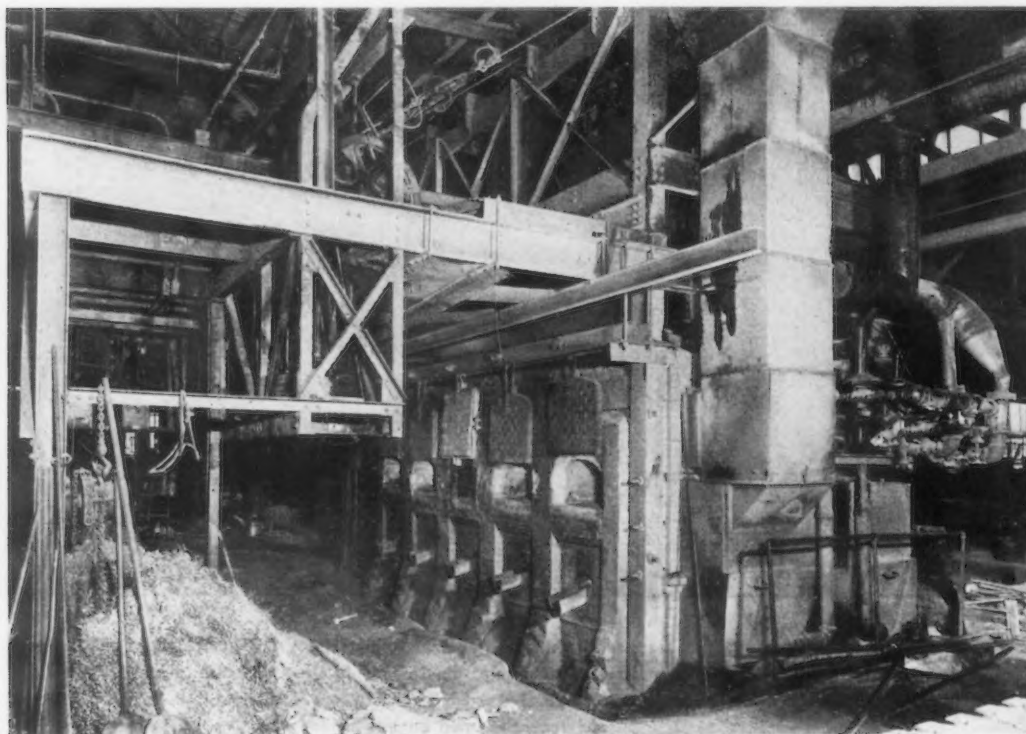
has a capacity of 150,000 lb. in 24 hr. It is gas-fired, but also equipped for oil firing. The material is shoveled through any one of five doors into the melting chamber and, after melting, is agitated by a series of motor-operated devices which release the gases. There is also a series of other chambers, through which the molten metal is moved either by mechanical means or by gravity. In these chambers the aluminum is treated by the addition of alloys to produce an alloyed metal conforming to specifications.

The furnace is under pyrometric control. Sometimes it is desirable to operate it at unusually high temperatures to accomplish the proper reactions. It is charged continuously as required for the casting floors. The quantity depends on the percentage of aluminum contained in the material and the amount of metal needed for a day's run.

All material is analyzed before go-

ing into the furnace in order to determine what elements it contains that are not wanted. Then it is smelted in such a way as to remove the undesired elements and alloys are added to secure the composition desired. By mixing charges having different quantities of alloys, it is sometimes possible to avoid the addition of certain metals. For example, if the aluminum that is being smelted contains more copper than is specified in the castings, other material containing less copper can be added to the charge in sufficient quantities to bring the copper content down to the desired percentage.

The furnace is tapped on the side opposite the charging door through several spouts into ladles from which it is poured into the molds. Material not used at the end of the day's operation is poured into chill molds and is reprocessed the next day. Slag in granular form is lifted out through the charging doors or, in fused form, is run out through special spouts.



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SPECIAL aluminum melting furnace at plant of the National Bronze & Aluminum Foundry Co., Cleveland. This picture shows the charging side of the furnace, which is approximately 24 ft. long, 18 ft. wide and 8 ft. high. Spouts shown under the charging doors are for running off molten slag. Above the furnaces is the mechanical equipment for operating the agitators. Gas and air valves are shown at the right.

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RECOVERED SPECIAL FURNACES

By the purifying process the oxides and occluded gases are removed and standard alloys are produced which are claimed to be in a highly refined and purified state so that the metal will develop the highest physical properties. Because of its high fluidity, it is stated that metal produced in these furnaces can be poured at 50 to 100 deg. F. lower than aluminum alloys made with remelted aluminum in the ordinary type of melting furnaces. The metal is said to have a fine dense grain and uniform texture, with freedom from hard spots and other inclusions, and to have high machinability.

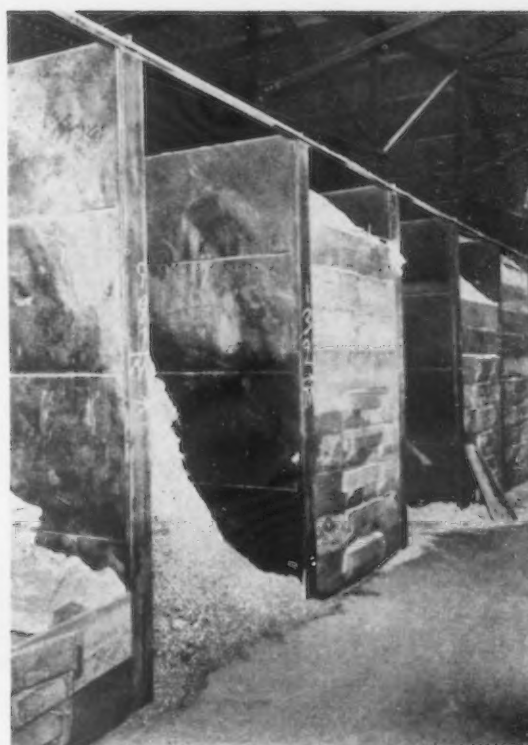
Tenual, a name applied both to the product and the process patented by the company, is used for castings for any purpose for which aluminum castings are adapted.

In the motor car industry Tenual aluminum is said to be used in some of the highest priced as well as in the cheapest cars and, because of its

purity and freedom from inclusions which promote local galvanic action, is especially successful for architectural work and marine work, where corrosion-resisting properties are essential.

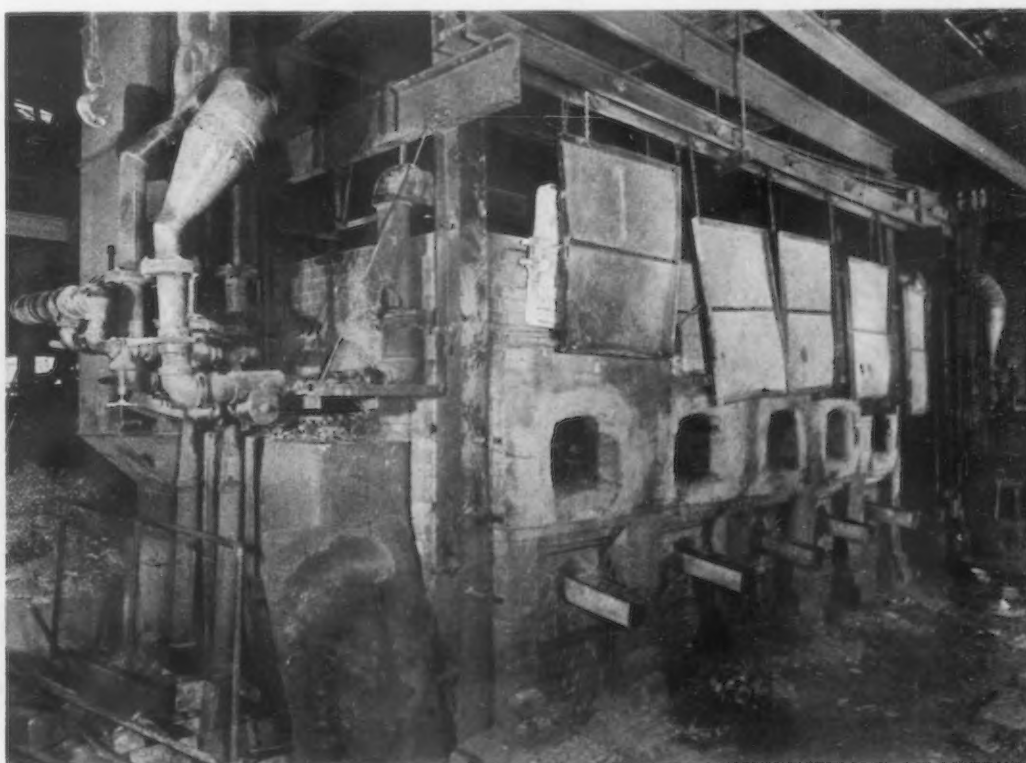
The development of this process is especially interesting to the aluminum trade on account of the future effect which it may have on the industry as a whole. There is a disparity in the present market quotations between

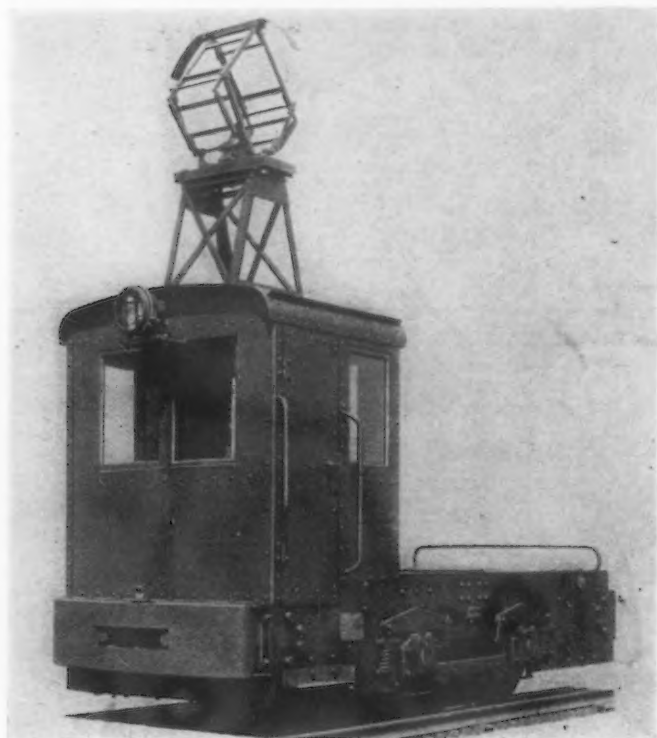
prime aluminum and secondary aluminum ranging from 6c. to 10c. a lb., according to the alloys compared. This disparity does not exist in the non-ferrous metals such as tin, copper and zinc, due mainly to the improved methods of refining these other metals. It is, therefore, possible that the Tenual process may overcome this disparity to a large extent and in so doing have a marked effect on the price situation in the industry.



POURING side of the furnace. Openings above the pouring spouts are for cleaning out the furnace chamber. (at right)

SOME grades of waste aluminum, which is the raw materials used, are mechanically separated before sorting. All the material is sorted according to analysis and placed in a series of steel bins. One row of these bins is shown. (above)





ELECTRIC LOCOMOTIVES FOR STEEL AND OTHER MILLS

By E. B. EDWARDS
General Electric Co., Erie, Pa.

A LOCOMOTIVE of 6 tons employed for hauling slag to the dump. This is in a small Mexican steel plant where loads are light. It obtains its power from overhead wires.



IN steel mills as well as in many other industries there are various track gages, specific loads to be handled and different cycles to be met. Under these circumstances it is not possible to describe any single unit as being typically a steel mill locomotive. The General Electric Co. has built a variety of electric locomotives for switching in and around steel plants, and many problems of transportation have been investigated where it would be practical and economical to use this type of locomotive.

The haulage around a steel mill

which can be handled by locomotives may be classified in the following manner, and with each there will be given a brief description of an electric locomotive now performing similar service.

Coke Ovens

In modern by-product coke plants the coke quenching cars are generally handled by electric locomotives. The high cab gives them a peculiar appearance. It is necessary for the operator to be located high so that he may see the various operations performed. The car is moved to the water

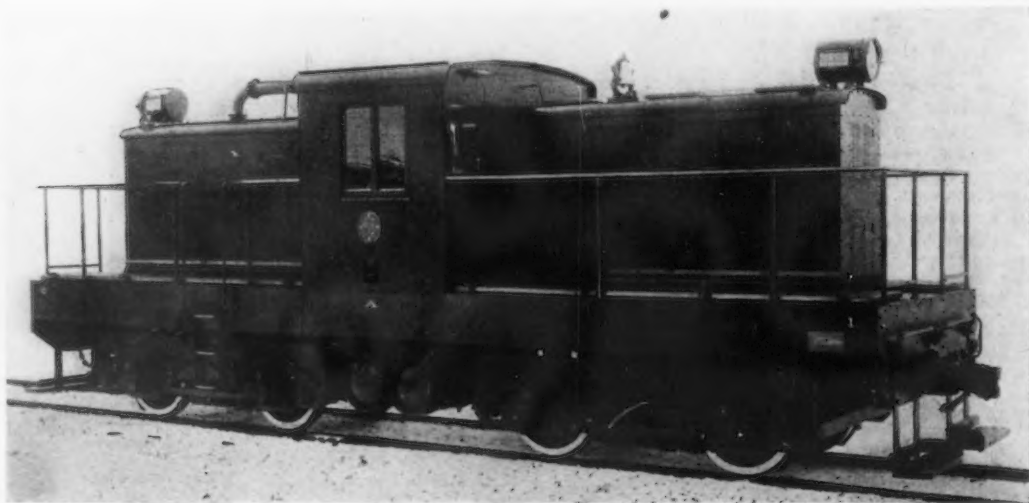
tower and the operator, from his platform, turns on the water for quenching. The next movement is to the unloading station. Here the car is dumped. The car doors are air or motor operated, the control for which is placed in the locomotive cab.

Furnaces

Blast furnaces are charged with the aid of electrified transfer cars, into which the ore and other material from the overhead bins are dumped. There are cases where similar cars operate over the top of bins and drop ore and stone into them, and the material is



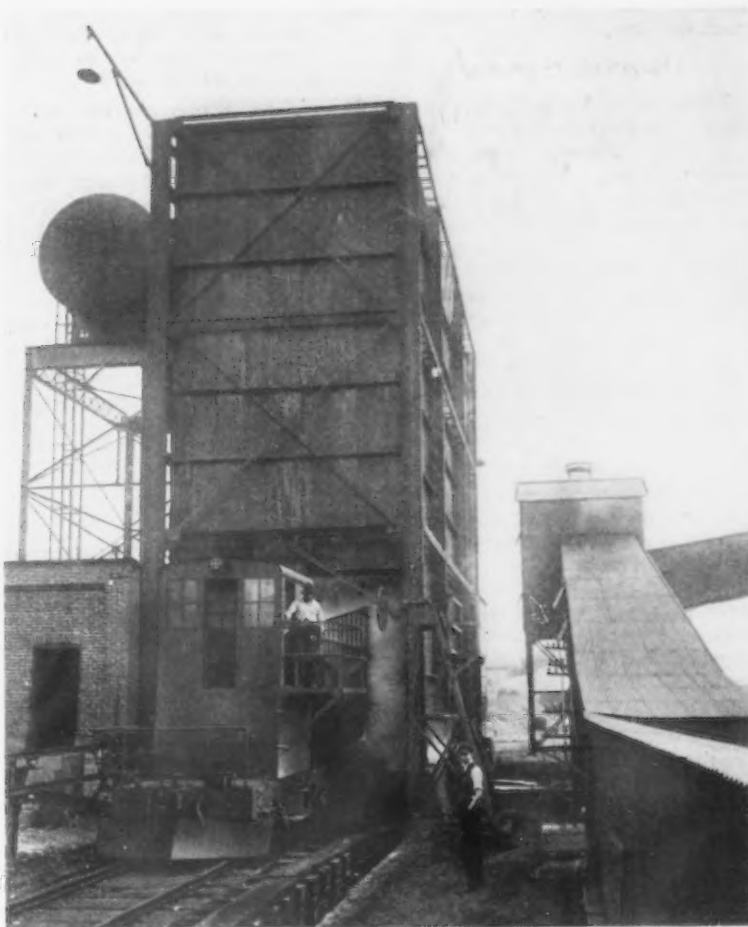
FOR better observation, the cab of this electric locomotive is high in the air. It is used in handling coke cars under the quencher and to the discharge. The locomotive operator controls the water used in quenching.



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ELECTRIC locomotives in a variety of adaptations have been introduced into industrial service. Some combination units are being used in which electric batteries supplement, on peak loads, the pull of a Diesel engine, being recharged automatically when the Diesel is not heavily engaged in haulage. Some of the characteristics of electric locomotives for particular purposes are brought out in this article.

▼ ▼ ▼



COMBINATION engine and battery unit. The engine is in the narrow hood, while the batteries extend along both sides of the unit, above the wheels and underneath the walkway boards.

delivered to the furnace by conveyor. The hot slag in many cases can be handled to the dump by electric locomotives.

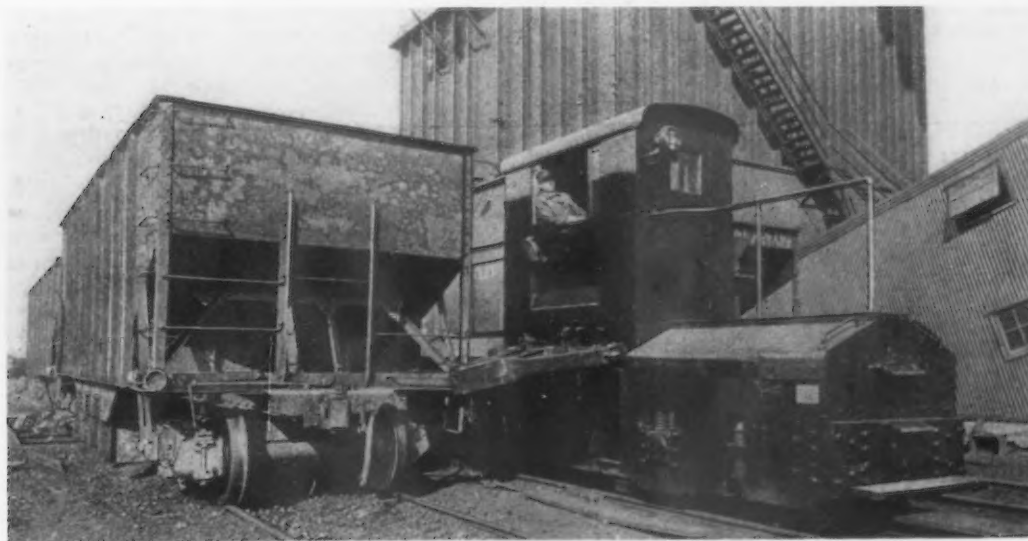
A locomotive built for such service for a plant in Mexico is a modification of a mine-type locomotive, with a cab over the operating end. It weighs 6 tons. A small pantograph trolley collects current from the overhead wire. As the fill expands, the

track and trolley wire are shoved along. A 25-ton locomotive handling larger slag pots has been built for the Youngstown Sheet & Tube Co.

Charging open-hearth furnaces represents a different problem. Handling of cars to and from the furnaces is an arduous duty 24 hr. of the day. On account of the proximity to the heat of the furnaces, high rolling friction can be expected. At some of

the older plants, in particular, limitations of height and width have offered a difficult problem to surmount in the consideration of an electric locomotive.

A modern small plant at Erie, Pa., uses on the charging floor a standard-gage storage-battery locomotive. This unit is on duty 24 hr. a day, the battery being recharged at intervals between trips. A duplicate locomotive



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CAR-PUSHER, showing the form of pusher arm and how it may be brought back against the cab and out of the way of obstructions. The power rail underneath is protected by the overhanging boardwalk.

▼ ▼ ▼

is used by the same company in the machine shop.

Handling Ingot Buggy

Transfer of ingots from the soaking pit to the rolls calls for prompt service. The distance the locomotive moves the ingot buggy is usually so short that the whole run is practically one of acceleration and braking. To meet such conditions the locomotive weight must be ample to keep within the slipping point required for acceleration. The motors must have suitable characteristics to provide the required speed and be able to stand up under the frequent peak loads.

At the Lackawanna plant of the Bethlehem Steel Co. there are two 10-ton locomotives each equipped with two 95-hp. motors. The control employs an unusually large number of contactors. The master controller has one handle. The direction of movement from the mid-position determines whether the locomotive moves forward or reverse. The first steps either way provide rheostatic braking.

When accelerating, the handle is moved over these steps, but after the locomotive has been in motion and the handle is returned on any of these steps, the rheostatic braking takes place. Thus the control provides that on all positions there is motoring or braking. In case of power failure, normally closed contactors provide for rheostatic braking. The hand brakes are quick-acting. When released by the brake handle, heavy springs apply the brakes.

Handling Standard Railroad Cars

Several side-arm pusher locomotives have been built for spotting cars at loading or unloading stations. Some of these may be found at the plants of the Toledo Furnace Co., Toledo; Bethlehem Steel Co., Buffalo; and Ford Motor Co., at Detroit. Usually these are built for narrow gage. The side arms make contact with the corner of the car, and the car or string of cars is spotted as desired. Several of a lower design pusher type are working at the Toledo Docks of the New York Central Railroad. Here the location of the operator allows him to attend to car couplings.

Incoming and outgoing railroad car-shifting presents varying problems. The location of the plant with respect to railroad sidings, grades, cars to be handled per trip and number per day, as well as conditions which may restrict the use of trolley or third rail, in part or in total, will govern the selection of the haulage equipment.

A 65-ton combination Diesel, battery locomotive, developed in 1930, is of a type and size which should find a field of practical application for general yard switching about a steel plant. This locomotive is shown. It is equipped with four 165-hp. motors, type M control, one 150-hp. Diesel engine, a 100-kw. direct-connected generator and a 165-kwhr. battery.

The battery cells are within the frame, just above the wheels, and extend the full length, both sides, except under the cab.

The Diesel engine and generator furnish sufficient power for the major operation of yard shifting service. Since the Diesel engine has practically no overload characteristics, the storage battery automatically takes hold for the peak requirements during acceleration and the like. Furthermore, the engine set automatically recharges the storage battery when the locomotive is idle, or under light load.

The engine set, running at constant speed, has the advantage of operating under ideal conditions for maintenance

and economy of fuel. Its low cost of operation should be a prime factor, along with its operating characteristics, in the consideration of future yard switching applications, to which this type of locomotive is particularly suited.

These few examples illustrate some of the applications about steel mills and give an idea of the variety of electric locomotives that have been built for such service. However, the locomotives mentioned do not cover the entire range of size and equipment that may be available. Where tracks are down or can be laid there is always an opportunity to apply electric locomotives.

Parking Machine for Automobiles

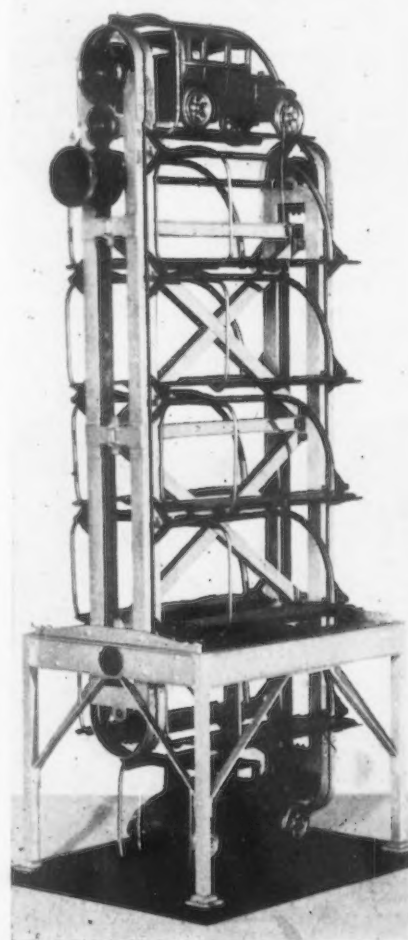
An automatic parking machine enabling the parking of 24 automobiles on a ground space little larger than that required by an ordinary double garage has been developed by H. D. James, consulting engineer of the Westinghouse Electric & Mfg. Co., East Pittsburgh, incidentally creating a new use for steel. The machine, a model of which is shown in the accompanying illustration, consists of cradles, one for each car, supported be-

tween two endless chains which pass over sprocket wheels at the top and the bottom of travel; the chains are driven by two electric motors, and, by means of a push-button control (or its equivalent), any cradle can be brought quickly to the driveway level for receiving or discharging an automobile.

Three general methods, all of which use substantially the same control, but different master switches, are used for operating the parking machine. The key system is the one best suited for garages where the spaces are rented for a fixed time. Another method of operating the machine is by push-button control, a method especially suitable for use in a public garage, where the push-button can be located in the cashier's office. The third method, the coin system, is the same as the push-button system except that a coin machine is used instead of push-buttons. The driver deposits a coin, which opens the door and provides a space for parking his car.

The parking machine can be operated only when the door or gate is closed. Inside the inclosure for the machine, at the driveway level, are two platforms, one on each side of the cradle. Persons entering or leaving the automobile will stand on one of them, thus, by opening a contact, preventing the doors being closed so long as anyone is within the inclosure. This is an added precaution, for as previously described, the control for the machine is arranged so that it cannot be operated when the driver is inside the inclosure.

Each machine of 24 parking spaces is 105 ft. high and occupies a ground area of 16 x 24 ft. for an automobile 18 ft. long. Where several machines are installed most of them can be made for shorter automobiles, thus reducing the required ground area and the first cost. When desired, a less or greater number than 24 cradles may be used; for each pair of cradles omitted or added the structure is changed eight feet in height. The machine may be arranged for loading and unloading at either the bottom or the top of the loop.

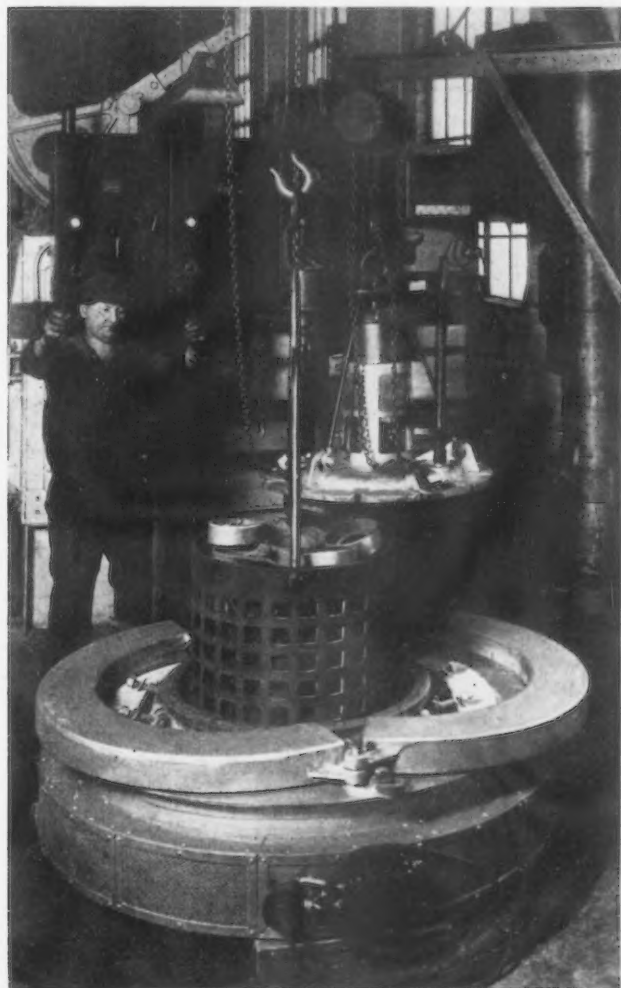


Electric Furnace Lowers Carburizing Time

SMALL floor space; close control of temperature, depth and character of penetration; a worthwhile saving of time, as well as flexibility of operation which admirably fits the needs of a jobbing shop, are among the characteristics of a Hevi Duty Electric Co. furnace recently installed by the Lindberg Steel Treating Co., Chicago. A second unit is in course of construction.

The furnace now in operation is rated at 88 kw. with alternating current at 230 volts. Its capacity is 1800 lb., though each load will vary widely, depending on the character of the

▲ ▲ ▲
FURNACE with
cover in place,
showing fan drive
motor, oil pot and
flame pipe.
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▲ ▲ ▲
PARTS to be car-
burized are placed
in a basket which is
lowered into the fur-
nace retort.
▼ ▼ ▼



work to be treated. The metal retort, which is heavily insulated and lined with firebrick, is set in the floor so that the top of the rim is about knee high. The electrical elements, arranged in upper, middle and lower banks, surround the inside of the retort.

Parts to be treated are systematically placed in a basket which measures 24 in. in diameter by 48 in. high. The character of the work determines whether or not it must be separated by screens placed in the basket. A jib crane with chain fall is used to lower the basket into the retort and also to place the cover on the furnace. The cover is then securely clamped in place.

Mounted on top of the cover is a vertical motor the shaft of which extends to the inside of the furnace to drive a fan. This motor is started when heat is turned on in the furnace. Each zone or section of heating elements is controlled by a separate switch and relay, and has its own Leeds & Northrup temperature control. The three elements are turned on simultaneously and a temperature of about 1700 deg. F. is reached in 4 hr. with a 1500-lb. load in the basket.

Attached to the furnace cover is an oil pot which is fitted for hand regulation. Oil is turned into the furnace when the temperature reaches 50 to 75 deg. F. below the carburizing point. Normal consumption of oil, which is

supplied by the furnace builder, is about 1 qt. an hour. Projecting through the furnace cover is a small pipe which is lighted for use as a telltale flame after oil has been turned into the retort. The operator gages the proper rate of feed of oil by the color of this flame. A blue flame indicates that insufficient oil is being used. A clear golden flame assures the operator that the rate of oil feed is correct.

When the desired depth of case has been reached, the oil is cut off and the basket is allowed to remain in the furnace with heat turned on for a soaking period during which the carbon in the case is more uniformly diffused between the outer and inner limits of the case depth. This method of control has been found by the Lindberg company to require considerably less time than other methods in which carburizing temperatures must be dropped.

When the carburizing cycle has been completed the heat is cut off, the cover is removed from the furnace and the basket with its contents is transferred

to a floor pit which is closed and sealed. In this way air is excluded and the product cools slowly.

A few examples will serve to illustrate the operation of this furnace. A 1339-lb. charge, which was given a $\frac{1}{8}$ -in. penetration, required 4 hr. to reach the carburizing temperature when starting with a cold furnace. It required about 16 hr. at 1750 deg. F. to get the desired penetration after which the product was held at carburizing temperature without feeding additional oil, for a period of 3 hr.

A 1551-lb. charge, requiring a $\frac{1}{16}$ -in. penetration, consumed 560 kwhr. when starting with a cold furnace and only 354 kwhr. when starting with the furnace after it was hot from a previous carburizing operation.

The time-saving element both as to standard practice and control are worthy of consideration. Finish, appearance and quality are fully up to the standards required in the Lindberg shop. This furnace has also been successfully used for drawing temper and for nitriding.

Gas Oven for Uniform Drawing and Tempering

A GAS recirculating, air drawing oven, known as Type "H," has been developed by the Despatch Oven Co., 622 Ninth Street, S. E., Minneapolis, Minn. It is intended to permit air drawing and tempering of products uniformly and economically, and is designed for all low temperature heat treating and air drawing requiring a maximum temperature of 800 deg. F.

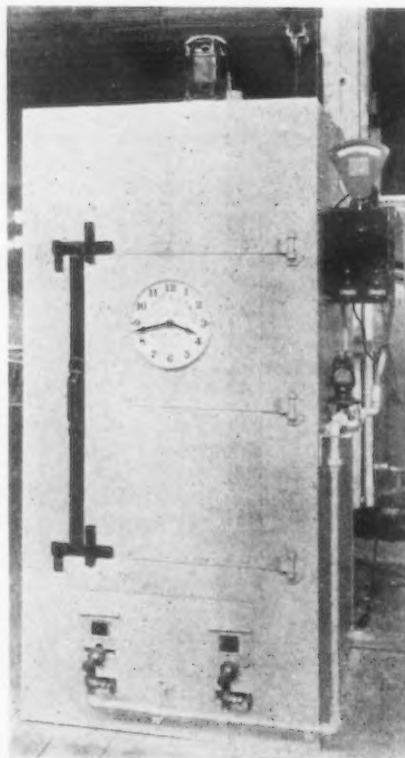
The inside working space is 2 x 3 ft. and 4 ft. in height, but the oven can be constructed to provide any capacity required. Of the double-wall type, it is reinforced with structural steel, and the walls themselves are of heavy steel. Five inches of insulation between the double walls reduces heat losses to a minimum and provides uniform temperature on the interior. In addition to the double walls, a third forms an air space and lines the interior chamber.

This lining wall forms a baffle for heated air generated in the heating chamber, which rises to the top of the oven without entering the working chamber. A fan accelerates this flow of air to the top and forces it down on the parts being processed.

In the third or lining wall, near the bottom, is a slot on each side through which the air in the chamber passes out and mixes with the heated air rising from the gas burner. In this way the air from the chamber is continuously raised to the proper temperature and recirculated, providing a saving in gas over the usual cost of heating air from room temperature, as the recirculated air is

only raised as a rule 5 to 10 deg. F.

As the heated air is forced down on the parts uniformly by the fan, transmission and penetration of the heat is said to be more rapid. Uniformity is claimed to be within 5 deg. F., plus or minus, and is further assured by a vapor tension thermostatic system, which controls within close limits. After adjustment for the required temperature, the thermostatic control, operated in conjunction with a relay and motor-driven valve in the gas supply line, requires no further attention.



New Publications

A pamphlet of 12 pages, well illustrated, has been put out by the National Safety Council to cover accident prevention in connection with the operation of trains within industrial plants. It deals in a thoroughgoing manner with all the moving-car hazards customarily encountered in such plants, and shows how they can be minimized by proper attention to regulations. Many of the illustrations show physical methods taken to obviate the probability of accident at particularly dangerous points. Safety rails, guards of various sorts, protection for power circuits, foot guards in switches and crossings, all are illustrated, show how easy it is to avoid trouble, if only the will be present.

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A research bulletin entitled "The Plating of Rolled Zinc and Zinc Base Die Castings" by E. A. Anderson and C. E. Reinhard has recently been issued by the New Jersey Zinc Co. Its 16 pages are fully illustrated, and a foreword states that the object of the bulletin is to assemble as concisely as possible information necessary for the practical plating of rolled zinc and die casting zinc parts. The recommendations are based upon a careful research conducted in the company's laboratory at Palmerton, Pa.

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A steel heat-treatment chart has been issued by the W. S. Rockwell Co., New York. It embodies in compact form factors that are ordinarily involved in the heat treatment of steel. In vertical columns on each side of the chart there are equivalent Fahrenheit and Centigrade temperatures with corresponding heat colors. At the bottom of the chart are figures for carbon content, and in the center, reading vertically from these figures, the trade classifications of and uses for steels of corresponding content.

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"A Method for the Standardization of Permeameters at High Magnetizing Forces" is the title of research paper No. 279, by R. L. Sandford of the United States Bureau of Standards. It is a description of apparatus suitable for the testing of standard magnetic test bars which are to be used for the standardization of magnetic permeameters with high magnetizing forces. It is fully illustrated.

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"The Effect of Smelter Atmospheres on the Quality of Dry Process Enamels for Cast Iron" is the title of a report of an investigation at the Engineering Experiment Station at the University of Illinois, and is published as Bulletin No. 227. Its 18 pages are fully illustrated, particularly with charts.

Hard Facing Is Increasing Output and Cutting Costs

By W. A. MOORE
Haynes Stellite Co.,
Cleveland

DURING the past few years there has been a remarkable increase in the use of hard surfacing throughout the entire industrial field. This consists in the application of wear-resisting alloys. In the form of welding rod, to machine parts subjected to abrasion and a combination of abrasion and heat. The purpose is to protect the wearing surface and thereby increase the life and general efficiency of the part. Inasmuch as actual job comparisons show three to six times greater life, it is easily understood why hard surfacing is saving industry thousands of dollars yearly.

The application of a layer of one type of abrasion resisting alloy to the wearing surfaces of a cast iron or steel part is more of a tinning than a welding operation. The material is flowed on when the surface of the base metal is just at a sweating heat, and a carbonizing flame containing an excess of acetylene is always used.

Wear-resisting alloys have made it possible to use an electric screw type, continuous flow, pressure gun with which the tap hole of the blast furnace can be plugged at any time. This gun consists of a right and left hand screw in a double barreled shell. The peripheries of screws are coated on the first two and one-half flights, and the nozzle has eight treated pads, $\frac{1}{2}$ x $\frac{1}{4}$ x 7 in. long, which act as a bearing for this end of the screw and stop excessive wear of the bore. Between these pads are grooves which become filled with clay and offer sufficient resistance to prevent slippage of material past the screws.

If these parts were not hard faced, they would wear so rapidly that this type of gun would be impracticable. The auger used for drilling out the solidified mud in the tap hole is also surfaced on the face of each flute for about $\frac{1}{2}$ in. and will drill six times as many holes without being dressed as a hardened

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SURFACES subject to abrasion, or wear and heat, are finished with hard or wear-resisting alloys. Applications of the alloy are made in the form of welding rod.
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steel auger. Pug mill knives for mixing the mud are treated on the edge, with an increase in life of about five to one over steel, manganese steel or chilled iron.

Hard facing is used extensively on coal-pulverizer hammers, coke-pusher shoes and carbon scrapers. Hard surfaced hammers usually have a life of four to six times that of steel hammers. This represents a saving not only in maintenance but also in production, for after the corners of hammers commence to wear, the output of the mill decreases. There is also a marked increase in power required to operate the mill with dull hammers.

Gas blowing engines using waste gases from the blast furnace for fuel may have the cams and ends of automatic igniter push-rods coated, ef-

fecting a saving in repairs. Where steam blowing engines are used, the hook block on the Coolidge valves is hard faced.

In gas producers, the coal is stirred continuously with some form of water-cooled poker or agitator. Abrasion and heat cause the end of this poker to wear, oxidize and break away rapidly. In one case a treated, water-cooled poker has now been in continuous operation for nine months and is only about half worn. Another poker has now run eight and one-half months and is showing but little wear.

One of the greatest savings that hard surfacing has effected in the iron and steel industry has been made on the different guides in rolling mills. In one of the largest independent steel mills, a cast steel guide on the first finishing operation of the rail mill had to be changed every seven days and, after the first shift, had to be reground every three hours. A coated guide on this operation has run ten weeks without change. Not only has this been a large saving through reduction of time lost in changing guides, but the percentage of scrap pieces and seconds has been considerably reduced.

Treated entry guides on the diamond pass No. 4 and No. 6 stands of the bar and billet mills have shown a life of six to one over steel guides and, in one mill, they have reduced the inventory from 500 guides to 100.

Hard facing of wabblers on rolls and pinions is another job which is proving economical.

In the rolling of skelp, the edger guides suffer severely on account of the fishtail end of the strip, which whips through the guides and scores them badly. A thin layer of abrasion-resisting material applied to the wearing surface materially increases the life.

A recent interesting and very successful application is the hard surfacing of hammers on a structural steel gag press for straightening the

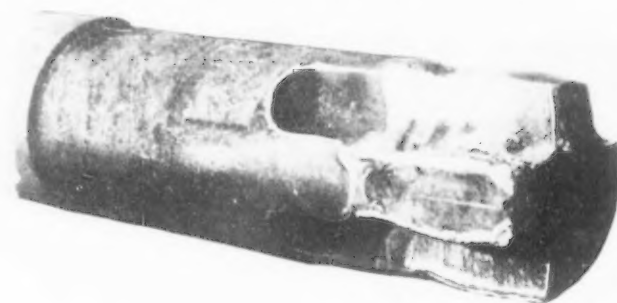


SLEEVE gear for driving edging rolls. Three of 14 teeth rebuilt and hard faced.

steel. When a piece of structural steel leaves the rolls, it passes over a table having three hammers on each side, which are electrically controlled by an operator. While the steel is in motion, the four end hammers push forward and support the steel, and one of the center hammers is driven against the bulge in the metal to remove the kink, the hammer opposite receding at the same time. This operation is repeated, the steel being turned over from time to time until it is straightened out.

The hammers formerly used on this machine would burn away $1/64$ in. at each contact and had to be replaced with new ones every six days. These hammers, which are 8 in. wide by 30 in. high, are now being hard faced with pads of wear-resisting alloy $3/16$ in. thick and 1 in. wide, $3/4$ in. being left between pads. These hammers have run for 90 days.

The sheet and tin plate mills have



REVERSIBLE blooming mill drive spindle, showing method of building up.

a machine called the Poole feeder. Its function is to separate the sheets and feed them one at a time through the tinning bath. The bearing end of the driving gear on the top roll of this machine is subjected to severe pressure, and suffers from lack of lubrication due to heat and attack of acid from the flux, necessitating its removal every six days to have the bearing turned down and a new journal box fitted. Hard facing this bearing makes it last for the life of the roll. Other hard surfacing applications on the Poole feeder are the throw-out mechanism, cams and cam pads; and on the doubler roll, adjusting screws and cams. These parts were formerly made either of chilled iron or hardened steel and, because of severe abrasion, wore very rapidly and had to be replaced frequently with new parts.

There are a great many cams on nail machines. The steel pinch cams

Urges Development of New Uses for Steel

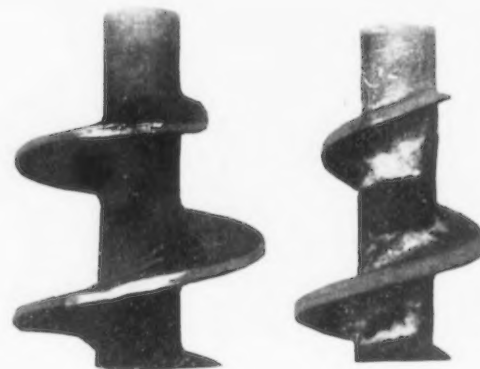
Cultivation of new markets for structural steel through research, investigation and analysis is urged in the second of a series of educational bulletins issued by the American Institute of Steel Construction, New

will run for only about three months before they have to be replaced. An application of hard-facing alloy, $1/16$ in. thick for two-thirds of the periphery, has increased the life of these parts to 18 months or more. The pad and adjusting screws of cut-off levers and double draft block rings are also

coated with resultant economy of maintenance.

One of the large manufacturers of steel car wheels is now blanking the center hole of forged steel wheels at a temperature of 2000 deg. F. The hub of this wheel is 8 in. through, and the hole punched is $4\frac{1}{4}$ in. in diameter. A carbon steel punch with a $5/16$ in. treated cutting edge will

HARD-SURFACED knockout blocks for four-roll board drop hammer.



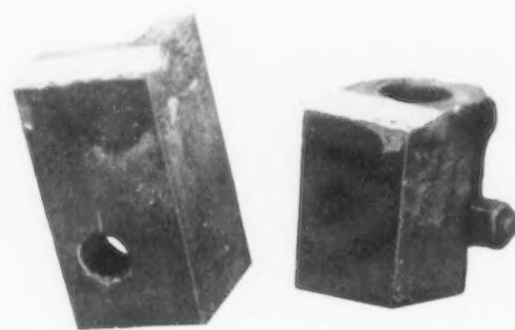
ELECTRIC mud gun screw for blast furnace, showing location of hard facing material.

punch from 100 to 160 holes. After this punch has been forced through the hot metal, it is released from the plunger or ram and allowed to fall to the floor instead of being drawn back through the hole.

Another advantage of the hard-surfaced punch, in addition to its long life, is that it leaves a clean hole. Only one roughing cut is required when machining the wheel, and the machining cost is reduced about 40 per cent.

As little as 1 oz. of material is applied on some parts and as much as 200 lb. on others.

Firth Hardometers — instruments that permit application of the Brinell method to thin materials, case hardened or nitrided surfaces—are now being marketed in the United States by the Tinius Olsen Testing Machine Co., 500 North Twelfth Street, Philadelphia. Less pressure is employed than with the Brinell apparatus; for soft or thin materials the indentation is made by a small steel ball, a diamond point of pyramid form being used on hardened surfaces. The Firth Hardometer was described at length in THE IRON AGE of May 8, 1930.



York. Experiments have already proved the practicability of this material for battled steel plate flooring for buildings and bridges, steel frames and flooring for residences, "Armour" steel roadguard for highways, steel dams, steel H-columns for piling for bridge and building foundations, and steel exterior walls of buildings.

Other markets awaiting develop-

ment include steel curbing for commercial and residential districts, steel highways, seadromes, elevated highways, automobile storage platforms and railroad crossings. It is pointed out that complete development of these markets would help solve the problems of excess production, reduce the intensity of competition and assist toward the stabilization of prices and profits.

Potentiometer Pyrometer with New Features

By THOMAS R. HARRISON

Director of Research, Brown Instrument Co.

HIGH accuracy, maintained throughout the life of the instrument, was a major consideration in designing the new potentiometer pyrometer here shown. This device is made by the Brown Instrument Co., Philadelphia, in indicating, recording, multiple recording and controlling types. Many new features are incorporated.

The accompanying sketch illustrates the operation of the potentiometer, a Null type, in which the galvanometer *A* directs the operation of mechanism to rebalance the circuit for each change in emf. that is measured.

At intervals of a few seconds, the galvanometer pointer, *B* is lightly clamped. A step on the selector table *C* rests gently against the pointer and positions a rugged secondary pointer *D*. The step lever *E* periodically moves downward into contact with the secondary pointer and rotates gear *G* secured to shaft *H*. The amount of rotation depends upon the position of the secondary pointer. The rotation of shaft *H* readjusts the slide wire contact *J* and simultaneously moves the pen *P*.

High Accuracy Is Maintained

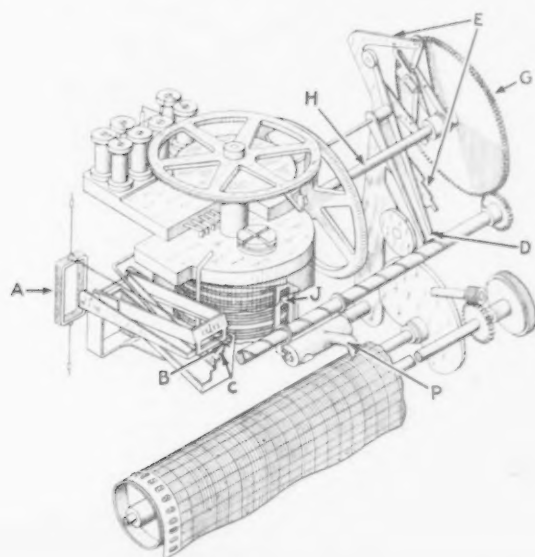
The Brown galvanometer is designed to have a uniformly high responsiveness under all practical operating conditions. The balancing mechanism exerts no strain upon the galvanometer pointer and the mechanical movements of the secondary pointer are comparatively large. As a result, no adjustments are needed to take up the wear on either the pointer or contacting mechanism and high accuracy is maintained over long pe-

riods of continuous exacting operation.

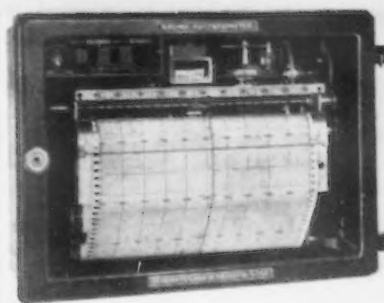
The charts and scales, 12 in. wide, are carefully produced to conform to the latest calibration values for iron-Constantan, Chromel-Alumel, and platinum-rhodium thermocouples. To derive full benefit from these wide charts, it is necessary to make suitable corrections for the natural expansion and contraction of the chart paper that takes place with changes in atmospheric humidity. It is because of this expansion and contraction that the strip charts have oblong holes at one side of the paper. Such expansion and contraction might cause errors of over 1 per cent of the reading of some chart ranges unless corrections were made. To eliminate such errors, a humidity compensator is built into the instrument; this device automatically corrects the pen position and brings it into proper register with respect to the chart markings. Also, the charts are printed under a standard condition of humidity. The new Brown potentiometer is believed to be the only recording instrument having this feature.

Another feature is the dust-proof case, completely inclosing the mechanism and suitable for wall, front-of-board, flush panel, or table mounting. The same instrument may be procured for wall mounting and subsequently mounted flush on a panel board. The galvanometer is completely inclosed in a compartment with a glass window to protect it from mechanical injury and from air currents when the door is open.

The galvanometer pointer and suspensions are relieved of practically all the work by the introduction of a



THE measuring and recording mechanism of the pyrometer is a Null type potentiometer. The galvanometer (*a*) controls the mechanism through a secondary pointer system.



The 12-in. recording charts are calibrated for various types of thermocouples. Indicating, multiple-recording and controlling types are also available.

"secondary pointer" system, wherein a rugged secondary pointer assumes a position in magnified proportion to the galvanometer pointer and then governs the adjustments of pen and slide-wire contact.

The slide wire is unusually long, 40 in., which permits the use of a relatively large-diameter wire. This reduces the effect of wear, makes accurate operation easily maintained and permits more convolutions and consequently finer scale subdivisions, without increased resistance. The slide wire, in spiral form, is inclosed in a glass container which can be filled with oil to prevent corrosion or fouling of the slide-wire contact and further reducing wear.

Adjustments Easily Made

The pen is moved by a stainless steel shaft with a long spiral groove and is operated in conjunction with the slide-wire contact by means of a positive pawl-driven mechanism that cannot slip. The long slide wire and the spiral shaft pen drive, permit close settings of contact and pen with relatively large mechanical motions produced by the pawl-driven mechanism; thus the necessity for extremely close adjustments of the drive mechanism is obviated and the adjustments are not easily disturbed.

Automatic control is obtained through mercury switches which can handle up to 50 amp. at 220 volts or 60 amp. at 110 volts. As the mercury switches are sealed in glass, no open arcs occur and danger of fire and explosion is eliminated. The instrument may be provided with as many as three mercury switches, making it applicable to the operation of various valve control mechanisms or signal lights. The control temperature is easily set by a knob projecting through the front of the door. This knob can be left in place or removed as desired.

Multiple recorders employ the color-code used with other Brown multiple recorders. A new "balanced stroke" feature causes the record to be printed and the instrument to be connected to another thermocouple as soon as the proper balance adjustment has been reached. This results in more

frequent printing and consequently more accurate and legible multiple records.

In the Brown potentiometer, the terminals for both the thermocouple wiring and the control circuits are in an inclosed terminal box with outlets for conduit wiring. A terminal block

with a temperature equalizing metal insert is provided for the thermocouple cold junctions and compensator, to assure accurate cold junction compensation.

Stainless steel is extensively used and bearings are of bronze or nickel silver.

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Tube Cutting-Off Machine with New Features

A NEW cutting-off machine for tubes from 6% to 16 in. in outside diameter has been placed in operation by the Aetna-Standard Engineering Co., Youngstown. General features include smooth operation, accessibility of moving parts and rugged construction.

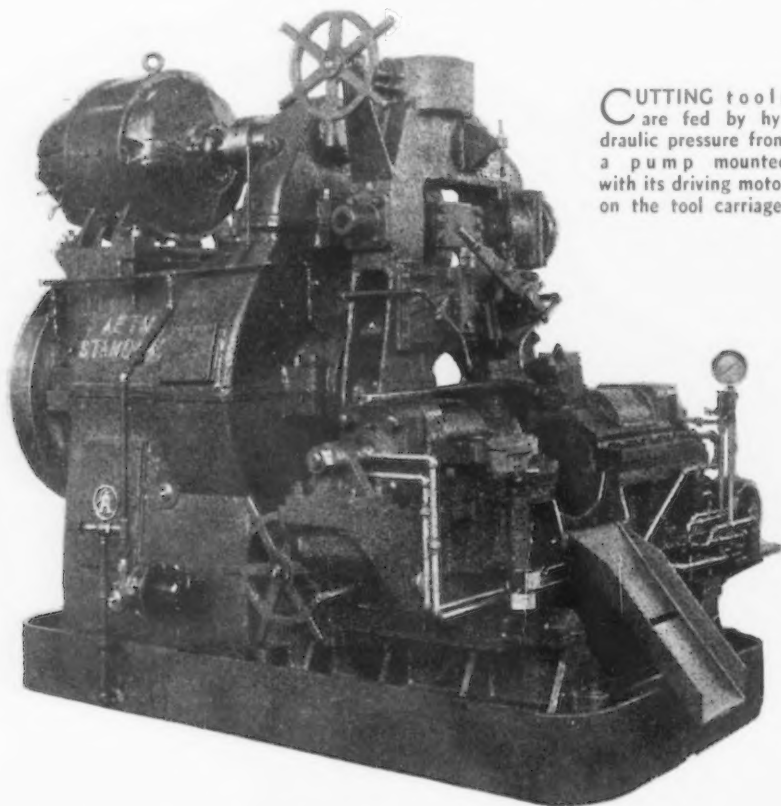
A five-jaw chuck, used to hold the tubes in the machine, is mounted on the entering end of the spindle instead of at the cutting tool end, as is usual. To assure proper stability of the tube being cut, a set of rounding-up blocks or clamps is placed just back of the cutting tools. Both the jaw-operating mechanism, which is of the lever and cam type, and the rounding-up blocks are operated by air cylinders. The internal moving parts are lubricated by means of a spray oil system employing the small motor-driven pump mounted on the side of the machine.

The cutting tools are mounted on

their own carriage at the front of the machine. This carriage slides on machined steel ways and is adjusted by means of a handwheel through a rack and pinion. The tool holders themselves are moved to and away from the tube being cut by means of a variable-pressure hydraulic feed which is adjustable to meet various conditions. The hydraulic pump and its driving motor are, in this case, mounted directly on the cutting tool carriage; this does away with flexible tubing or sliding joints in the oil lines from the pump to the oil cylinders that are inclosed in the tool holders.

Chips from the cutting tools are gathered in a reservoir under the cutting tool carriage, and are easily removed.

The cutting compound is also directed into this same reservoir, where, after passing through a series of strainers, it is returned to the cutting tools by its own pump.

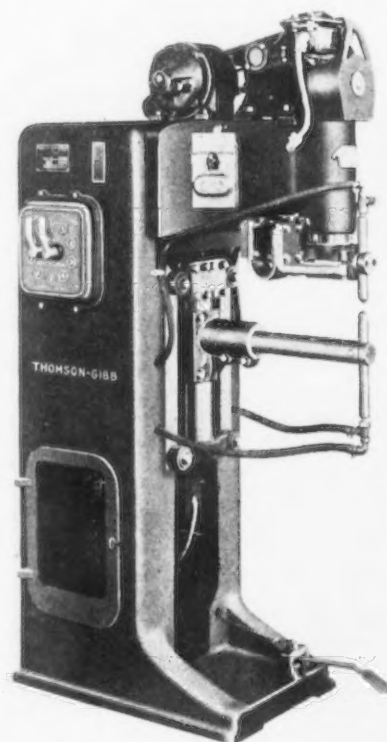


CUTTING tools are fed by hydraulic pressure from a pump mounted with its driving motor on the tool carriage.

New Spot and Projection Welder

A SPOT and projection welder of the press type with a straight vertical spindle action, intended to add to the life of the machine and its electrodes, recently has been placed on the market by the Thomson-Gibb Electric Welding Co., Bay City, Mich.

The No. 1 machine illustrated is built as a single-speed welder, units obtainable providing a range of welding speeds from 30 to 160 spots a



minute. Special machines may be had with multi-speed motors giving four welding speeds.

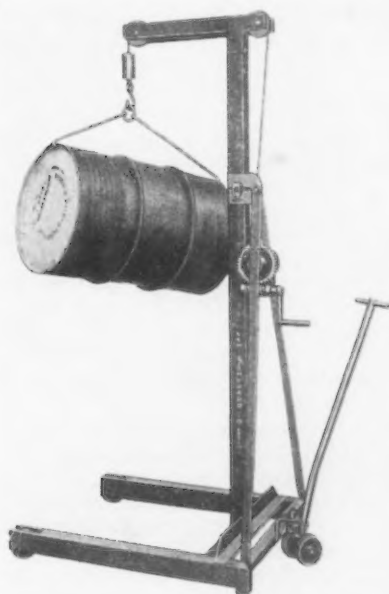
Flexibility of design is emphasized; throat depth and welding speed may be altered by replacing a few of the parts. Practically no discoloration or depressions appear in welds made with this machine and the action is said to prevent hammering of the welding points.

As the complete driving mechanism is mounted on top of the machine, minimum floor space is required and the moving parts are accessible. Drive from the motor is through a roller chain to a worm reduction and clutch unit running in a bath of oil. The worm gear, clutch, pressure cam and current-timing cam are all mounted on the same shaft. Moving parts are fully guarded, the reduction and clutch unit being completely inclosed. The nine points of engagement of the clutch make operation almost instantaneous with the depression of the foot treadle. Hyatt and Timken roller bearings as well as ball thrust bearings are used. Shafts are hard-

ened and ground. The fan-type cam timing the welding current is mounted at the front of driving shaft, making for ease in adjustment. The 20, 30 or 40-kva. patented water-cooled welding transformer provides 16 variations of welding heat. Welding pressures up to 900 lb. may be obtained. The welders are made with throat depths of 12, 18 or 24 in.

Revolving, Telescoping Floor Crane

PORTABLE cranes in heights ranging from 6 ft. to 14 ft., and capacities from 500 lb. to 2000 lb. and over, are being offered by the Lewis-Shep-



ard Co., Boston. They are made in four types: hinged, telescopic, revolving hinged and revolving telescopic. Drives may be either hand worm, hand spur, electric worm drive or by air motor or gas engine, depending upon requirements.

The worm drive has the self-locking feature, requiring no brake. The hand-spur-gear cranes are equipped with an automatic safety lowering device. Hand and power winches are interchangeable, so that at any time a hand crane can be equipped with power drive. The framework is of arc-welded structural steel shapes with open-end base.

Two types of transporting gears may be had—either the free lifting and steering handle, or the holdover-type lifting and steering handle. Floor and sheave wheels are equipped with roller bearings and lubrication is of the push type. Power-drive cranes are equipped with a master line switch with thermal overload protection and an automatic limit stop.

Plate Bending and Forming Hydraulic Brake

SPEED of operation, both for size and shape of work, sensitive control of variable-speed, and low maintenance cost are claimed for the plate bending and forming hydraulic brake illustrated, which has been developed by the Watson-Stillman Co., Roselle, N. J., in collaboration with the Duff Patents Co. Capacities of 250, 500 and 1000 tons are available.

The steel frame of the machine may be had in either welded or riveted construction. Its large open ends allow the work to be removed endwise and permit the handling of pieces longer than the bending die. If desired the frame can be fabricated by the user.

Alinement of the bending beam with the base is obtained by means of a parallel motion mechanism. The hydraulic cylinders for operating the beam are mounted on the frame and may be equally spaced to provide even distribution of the loading over the length of the bending die. To obtain a concentrated pressure at a given point, however, the cylinders may be unequally spaced to secure this result. The up-stroke or return of the beam as well as its pressure stroke is by hydraulic power.

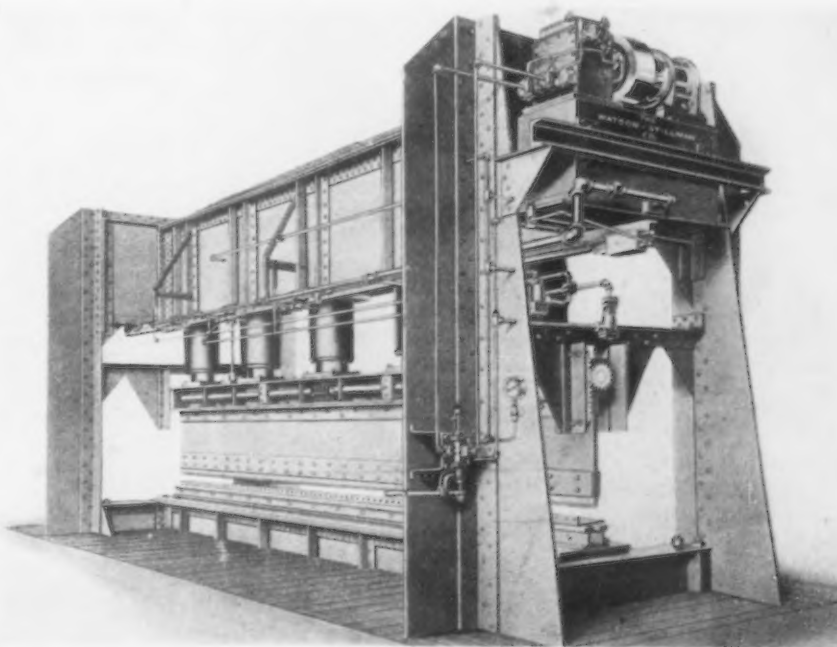
The cylinders, controlled simultaneously by a single lever valve, can be operated in multiple or in any grouping of one, two or three at a time.

Without loosening any bolts, each cylinder can be cut in or out of operation by means of a tell-tale valve-coupling mechanism that shows at a

glance which cylinders are in use. This selective cylinder control materially increases the speed of operation for light work and reduces the power consumption of the pump. Pipe spacers and bolts of different lengths may be used to change the opening between the steel rails, used for bottom blocks, in order to accommodate bends of various radii or sections of conical shape.

For operating the machine, oil at a maximum pressure of 2500 lb. per sq. in. is supplied by an Oilgear pump mounted on the end section of the press frame. The hydraulic system is entirely closed; oil discharged from the cylinders on the return stroke passes to a reservoir in the pump and motor base that also serves as a pre-fill tank for quick operation when the press is not under load. Lubrication to all moving parts is supplied by the same system; valve replacements, re-grinding and packing replacements are not necessary.

Operation of the brake is controlled by one lever valve with a swivel handle. This valve permits instant control of the rapid down-stroke, pressure stroke, neutral position, and up-stroke of the rams. A hydraulic gage and a push button control for the motor are located nearby. Electric signals can be installed to indicate the limit position of the bending die—an important feature in working a number of similar parts, as it avoids unnecessary operation of the rams on bending and return strokes.



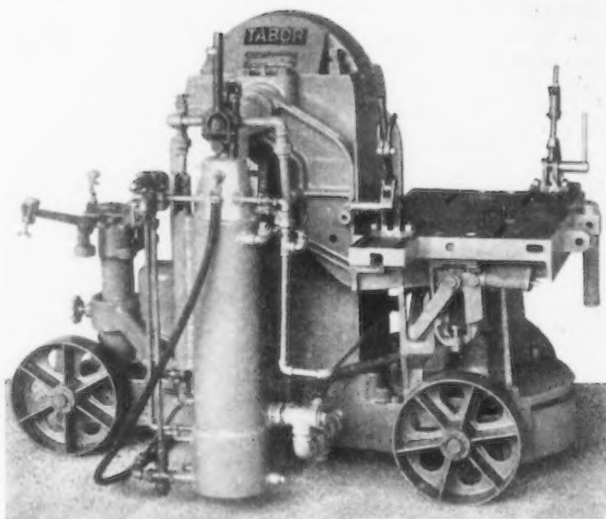
High Production Roll-Over Molding Machine

HIGH production may be obtained with the jar, roll-over and pattern-draw molding machine illustrated, a product of the Tabor Mfg. Co., 6225 Tacony Street, Philadelphia, that was exhibited for the first time at the recent American Foundrymen's convention at Chicago.

The long-stroke jarring blow of the machine requires a minimum of time for the ramming of molds. The roll-over operation requires only 4 sec., and the hydraulic roll-over mechanism is emphasized as being entirely safe even while operating at high speed. Although the table is free of the roll-over frame during the jarring operation, the two are automatically and positively locked together while the machine is rolling over. It is pointed out that the plate cannot be thrown.

An automatic device instantly levels each flask upon contact with the bottom board of the flask. This mechanism is controlled from the valve stand of the machine; it is not necessary for the operator to touch the leveling member. The pattern-draw mechanism,

▲ ▲ ▲
SAFETY even at high speed is a feature; it is not necessary for the operator to touch the leveling mechanism.
▼ ▼ ▼



ism, also hydraulically operated, provides the slow start and steady draw required to produce good molds that do not require patching. The self-aligning draw-guide is ball-bearing equipped; lubrication is unnecessary.

The machine is fully inclosed and protected from sand. Specifications include: table size, 18 x 28 in.; draw, 10 in.; diameter of jar cylinder, 4½ in.; diameter of roll-over cylinder, 7 in.; capacity, 350 lb. (with 80 lb. pressure).

as 25 tons. Consequently, the matter of storing and transporting them to the press and placing them in position for anchoring has become one of great importance.

Dies are not only heavy but they are bulky and valuable. Readily accessible storage space under cover can seldom be assigned for storage purposes between successive uses of dies. Hence outside storage, frequently several hundred feet from the presses, is usually utilized. This means transfer along the floors and outside into the open yard, where cranes may not be available, and calls for a powerful and rugged transporting device.

An electric tiering truck has been developed for this purpose by the Elwell-Parker Electric Co., Cleveland. This truck weighs about 13,000 lb. and is powered by a gas-electric unit. This delivers electric power through an interlocked control system to the motor, which drives the larger wheels near the operator, at the rear of the truck. The operator steers all six of the rubber-tired wheels by means of a 20-in. hand-wheel on his right.

Drive wheel tires are 22 in. by 6 in., while each front wheel carries two 15-in. by 5-in. solid rubber tires. All wheels are mounted on automobile-type, alloy steel, drop forged, heat-treated knuckles set on the tire center line. The front axle also accommodates its wheels to an uneven runway, for it is pivoted on a large forged alloy steel pin block, bolted between the ends of two heavy bar centersills, running back to the truck main frame.

The platform is built up of heavy structural and bent plate members. Having no support at the forward end, it is known as a cantilever-type load platform. The entire weight is carried on two great L-shaped steel arms provided with two rollers each, which travel up and down the vertical members of the frame. Thus the die, upon delivery at the press, may be raised to level of receiving table.

This raising of the load platform

15-Ton Electric Die-Handling Elevating Truck

DEVELOPMENTS in the art of metal automobile body production have reached that stage where the greater economies lie in the fabrication of the body out of the few-

est pieces. This, in turn, requires heavier and larger dies and correspondingly bigger and more powerful presses to manipulate these dies.

Some of these dies weigh as much



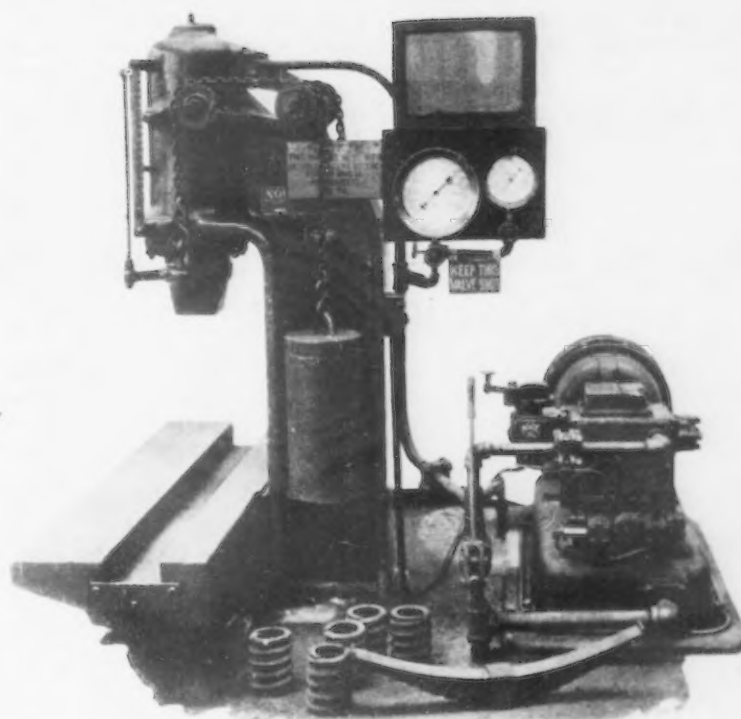
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ELEVATING truck, electrically operated, carrying 15-ton die from storage to press room. The truck uses its own power to slide the die off on to the press.
▼ ▼ ▼

is accomplished by means of a powerful electric winch mounted between power plant and uprights, with control apparatus immediately in front of the operator. He can adjust the height by winding in the multiple cables on the power winch, which is automatically controlled by an upper and lower limit switch.

This electric winch performs a dual function. In addition to elevating the load, its motor drives a secondary countershaft fitted at either end with a cable drum, set outside the edge of the load platform. The cables from these two drums, one on either side, are led down under sheaves at the rear of the platform, then led forward and passed around the sheaves on each side at the forward end of the platform.

From here the cable hook is carried back alongside the platform, beneath the overhanging die, and attached to the die. It is now but necessary for the operator to move his controller through the speed positions to wind in the cables, and the die moves toward the front end of the platform and slides on to the press platen.

To remove the die from the press, the two winch cable hooks are attached to the rear side of the die, to drag it on to the truck platform.



Special Machine Tests All Types of Railroad Springs

Wrought Iron Welding Elbows

COMPLETE wrought iron piping systems without the use of steel welding elbows have been made possible by the development of wrought iron welding elbows. These can be supplied by the Locomotive Terminal Improvement Co., Chicago, and the A. M. Byers Co., Pittsburgh.

Designated as "Weldells," these elbows range in size from 2 in. to 12 in., and are manufactured with the same radius and center-to-face measurements as standard radius fittings. In their forging, a tangent is formed on each end, making the units interchangeable with standard fittings, while the ends are beveled 45 deg. for welding.

Stock sizes include both standard and light-weight (or No. 10 gage) sections. The units are forged from wrought iron plate, with a smooth uniform internal diameter, and a reinforcing rib along both the outer and inner curvatures of the radius. The process permits these "Weldells" to be made from the same material as the remainder of a wrought iron piping system.

These fittings may be welded directly into a pipe line, eliminating all other fittings and threads. Flanges may be welded on each end, making a flanged fitting of standard dimensions. They may be had with either forged steel or cast steel flanges welded on one or both ends.

A MACHINE for testing all types of railroad springs has been completed recently for the New York, New Haven & Hartford Railroad by Joseph T. Ryerson & Son, Inc., Chicago, for the Van Nest shops of the New York, New Haven & Hartford Railroad.

Hydraulic pressure is furnished by a self-contained motor-driven Oilgear unit mounted on the machine, a feature emphasized as saving floor space otherwise required by an accumulator. The Oilgear system also permits a spring to be deflected at any desired pressure for three or four minutes at a time to provide a more accurate test. Maximum pressure of 50 tons is developed by the machine.

Full-elliptic springs for passenger cars as well as semi-elliptic locomotive and coil springs may be tested. The frame of the machine has an 11-in. throat and 25-in. wide work table which makes it practical to test these varied types of railroad springs. Both frame and work table are made of cast steel. A scale on the overhead ram cylinder indicates the deflection of the spring being tested; as the ram moves down, deflecting the spring, an adjustable pointer moves with it and shows the exact deflection on the scale. A large pressure gage having two dial readings indicates the pressure in pounds per square inch and the total pressure of the ram in pounds.

Portable Grinder Has Automatic Governor

FOR general grinding in foundries, automobile plants, locomotive and car shops and for finishing steel dies, tire molds or other work, the Cleco rotary grinder illustrated has been brought out in several sizes and models by the Cleveland Pneumatic Tool Co., 3734 East Seventy-eighth Street,



Cleveland. Two styles of handles are obtainable for outside or inside throttle control.

The rotor unit of the compact and powerful air motor is concentric with the arbor and is said to operate without recoil or vibration and to assure proper balance at all speeds. It is provided with four longitudinal slots, each accommodating a separate blade that is forced outward to the wall of a stationary cylinder, eccentric to the axis of the rotor. As one of these blades is always exposed to the air current, a constant rotation is established.

The arbor is made of steel, hardened and ground, and is mounted in a combination annular and thrust ball

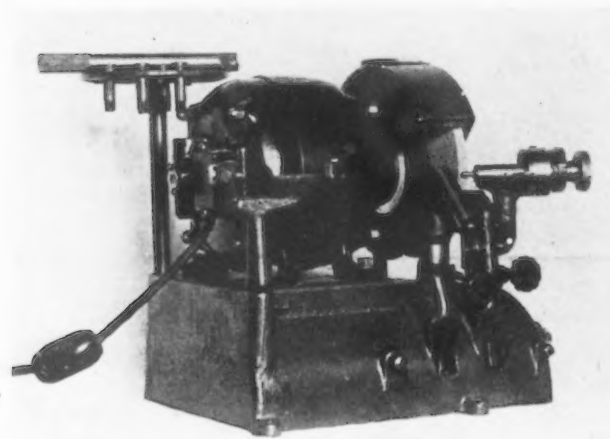
bearing at the rear end and a double-row annular ball bearing at the front end. The governor, a detachable unit, is designed to control the amount of compressed air used; when the machine is running light consumption is reduced to one-third. As pressure is

applied to the grinding wheel by the work, the governor gradually opens until the maximum power is supplied. This device also provides an economical supply of lubricant to the rotor from an oil reservoir at the rear end of the grinder body.

Tap and Drill Grinder for 1/2-In. and Smaller Tools

TAPS and drills ranging from the smallest to 1/2 in. may be sharpened rapidly on the grinder here shown, which is a new product of the

To dress tap or drill webs, the tool is placed in another holder and ground on the narrow wheel. By this process taps are given correct hook and chip



Wells Mfg. Co., P. O. Box 613, Greenfield, Mass.

The tool to be ground is lightly gripped in the draw-in chuck of a holding quill and the quill then inserted in the lining-up holder in front of the motor at the left. There the assembly is lined-up in correct position for sharpening. Then the quill is placed in the grinding holder, which is slowly turned to the right, bringing the tool into contact with the wheel, thus sharpening the point. A cam guides the motion of the tool holder, producing the correct relief.

A CAM guides the motion of the tool holder. Tap and drill webs may be dressed on the narrow wheel.

room and drills receive the necessary thin point.

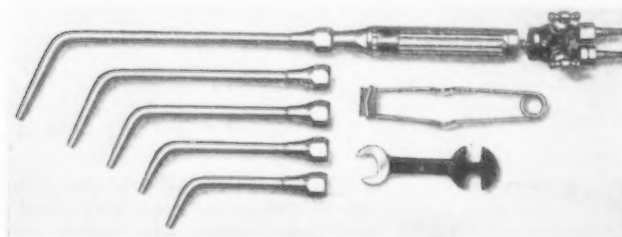
The machine is driven by a 1/4-hp. motor. Standard equipment includes one diamond, two emery wheels, six draw-in chucks for taps and six collets for drills. Cams to control the grinding of 2, 3 and 4-flute taps also are furnished. Regular fittings are suitable for taps and drills of 1/4 in. and smaller sizes.

Special provision, however, can be made for tap and drill sizes up to 1/2 in., for shoulder drills and for engravers' tools.

New Medium-Pressure Welding Blowpipes

TWO welding blowpipes have been added to the Prest-O-Weld line of medium pressure apparatus by the Linde Air Products Co., 30 East Forty-second Street, New York. Des-

ignated as Types W-105 and W-106, these welding blowpipes have a detachable valve body, to which the handle is secured by a simple and convenient locking device. This enables the operator to change quickly from the standard to different handles without detaching hose or hose connections and without use of a wrench.



TIPS are secured to the handles by a simple locking device.

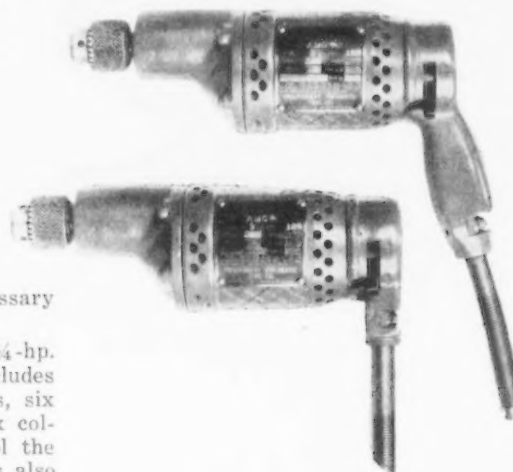
One-piece, hard drawn copper welding tips are used. Although regularly supplied with a head angle of 60 deg., this may be changed if desired.

Ten sizes of tips, Nos. 4 to 13 inclusive, are available for use with the Type W-105 handle. A stem adapter is available to accommodate tips for the Type W-107 aircraft welding blowpipe described in THE IRON AGE, April 16.

The Type W-106 blowpipe is similar to the larger W-105 type; it is particularly suitable for general light welding and soldering.

Thor High Frequency Electric Drills

SIX new tools have been added to the line of Thor high-frequency electric tools manufactured by the In-



Two styles of high-frequency electric drills; the bonnet type (upper) and the grip handle type (lower).

dependent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago. These tools are of the midget type, and are made in two styles, bonnet and grip switch, for 180-cycle current.

The bonnet type style fits in the palm of the hand and, being light, is easily handled. These small electric drills are especially designed for fast, accurate drilling for automobile body trim work, metal furniture, steel shelving and for radio and electric appliance manufacturers.

The bonnet type style is made in three speeds as follows: AMC, illustrated, 2300 r.p.m.; AMB, 2790 r.p.m., and AMA, 3700 r.p.m. The capacity is 1/4 in.; weight is 3 lb.; length overall is 9 1/2 in.

The grip switch style is made in three speeds also, as follows: AMC, illustrated, 2300 r.p.m.; AMB, 2790 r.p.m., and AMA, 3700 r.p.m. The capacity is 1/4 in.; weight is 4 lb. 1 oz.; length overall is 9 1/2 in.



A RAPID SURVEY OF THE WEEK'S EVENTS

PSYCHOLOGY

DEPRESSIONS, at the start, are largely psychological. So are recoveries. It does not take much to start things down or up.

Those who do not hold this to be true are asked to explain the world-wide reaction to President Hoover's war debt moratorium proposal. The monetary amounts involved are not large in these days of billions. If this move furnishes the psychological lever to start things upward, it will be economic statesmanship plus. A little loosening up of industrial and other pocketbooks *now* will effectively second the motion.



SUMMER SHUTDOWNS

SOME instances have been reported of proposed summer shutdowns of industrial plants ranging from one to three months' duration. The thought in most of these cases is to conserve employment for the coming winter.

Concerns whose prospects are such as to make this step necessary are probably choosing the wise course. But it should not be considered unless the operating profit margin has completely vanished. Idle plant and equipment produce "red ink" operating statements even without operations.

Fortunately, the number of companies faced with the alternative of continuing operations at a loss or suspending them at a loss is not large enough seriously to affect industry.



MODERNIZATION

MODERNIZATION of equipment is a double-edged sword, which cuts depres-

sions two ways at once. It puts money into circulation for the purchase of labor and materials and increases the efficiency of the purchasing company.

Modernization is not confined to the manufacturing industries. The railroads need it, too, and the manufacturing industries need the effect of the railroads' purchasing power. The Pennsylvania's award of 90 electric locomotives will help.



FREIGHT RATES

INTERSTATE Commerce Commission evidences willingness to expedite the hearing of the railroads' plea for higher freight rates, but of course gives no indication of its attitude toward the request. However, it seems probable that some measure of relief may be given. If this should be done, and result in large scale equipment buying by the railroads the effect would be constructive. But both action and reaction should come before winter. "If 'twere done, 'twere well it were done quickly."



EFFORT QUOTAS

AUTOMOBILE industry has taught us many things about mass production. But now it is setting an example in the establishment of sales effort quotas. Chevrolet, for example, has set a goal of 1,000,000 demonstrations per month. A leading truck manufacturer is pledging dealer salesmen to make sales contact with at least four prospects a day for the next 90 days.

Perhaps the stepping up of sales effort quotas could be profitably applied elsewhere.

REPLACEMENT

ONE of the problems of modernization is the disposal of the equipment replaced. Germany has had an unusual accumulation of used machinery because of her widespread modernization of plants during the past three years. Now Germany is planning to dispose of the surplus of replaced equipment by exporting it to other countries.



ADVANCE PLANNING

IN line with effort quotas such as some automobile makers are establishing for sales contacts, Ernst & Ernst, of New York, make the following pertinent suggestion:

"Every company has a certain amount of business on hand and in prospect, for otherwise it would not be in existence. And every company has an advance plan of some sort, although it may exist too much in the mind or minds of the executives. Let them put down their facts on paper, and the vague intangible plan becomes a definite workable plan. How much goods will be sold within the next few months, within the next year? Put it down, right or wrong, and the act of putting it down will in itself be helpful. How are they to be produced or handled? Examine this, scan the details, and the act is worth while for itself. Do the finances fit the plan thus far recorded? If not, make them fit, or else fit the plan to the finances. Are the internal affairs of the management in proper adjustment to carry out the plan? Close application to the question, with all its collateral questions, will yield suggestions for improvement."

ELECTRICAL VS. MECHANICAL DEVICES FOR FURNACE CONTROL

ALIVELY discussion took place on June 17, at the Cleveland meeting of the fuel division of the Association of Iron and Steel Electrical Engineers, between advocates of electrically operated devices and advocates of mechanically operated devices for controlling combustion in open-hearth furnaces. Most of the speakers alined themselves with one or the other of the two camps. A few, however, saw the good points of both systems, and were ready to use whichever appeared the best prospect for a given problem.

Discussing this matter in a symposium, the successive speakers included: Joseph F. Shadgen, Smoot Engineering Corp., New York; G. D. Conlee, Republic Flow Meters Co., Chicago; P. S. Dickey, Bailey Meter Co., Cleveland; W. H. Shallcross, Shallcross Control Systems Co., Milwaukee; R. W. Simpson, American Heat Economy Bureau, Pittsburgh; B. F. Keene, Leeds & Northrup Co., Philadelphia, and M. J. Bradley, also of the Leeds & Northrup Co.

As one expressed it, he believed in the electrical methods of control because he had been brought up that way. The sharp division of opinion on this point was brought out by striking examples of current practices along a good many lines. These comparisons were by no means one-sided—each advocate of a particular system showed how some of the other-minded advocates were not practicing entirely what they were preaching.

Subdivision of Control Devices

AMONG the corrective devices referred to in some detail by Mr. Shadgen were listed five groups: valves, dampers, rheostats, solenoids and, finally, brakes and clutches. He explained the division among the functions of these several devices, based partly upon what is to be done and partly upon design and various limitations. Valves, for instance, should be limited to about 14 in. in pipe diameter, because of the excessively large and cumbersome and costly valve bodies and accessories for larger sizes. Dampers were referred to as the single-plate type, and the louver type, the latter being on the multiple principle.

When it came to control, Mr. Shadgen pointed out the possibility of mechanical control through an infinite series of steps, from a full opening in

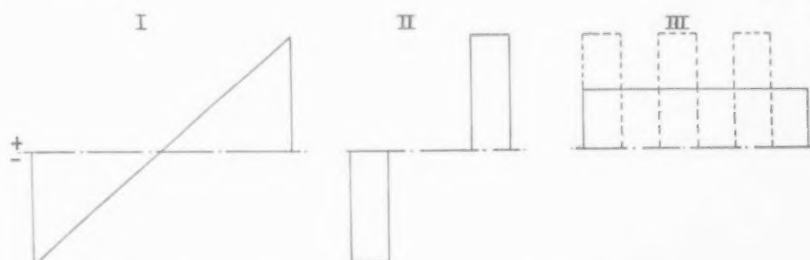
one direction to a full opening in another direction, for the passage of whatever fluid was used. This might be oil in an oil-actuated hydraulic system, or gases in the furnace passages, etc.

Contrasted with this he showed the push-button or switch arrangement for electrical control, in which the unit was either all on or all off, without intermediate gradations. This condition, as between the two systems, was illustrated by a blackboard sketch here reproduced. The third sketch

consideration complicated, by the necessity of periodic reversal of the flow of gas in taking advantage of the regenerative principle to get the high temperatures required.

Measurement Is a Prime Requisite

It is possible to measure almost all fuels used in open-hearth practice. Some of them are very easy to measure, such as natural gas and light grades of oil. Tars and heavy oils are more difficult of measurement, but it can be done. Flow meters installed



Characteristics of mechanical (I) and electrical (II and III) control. In I any gradation from plus maximum to minus maximum may be had. In II, push button, it is all off or all on. To obtain the equivalent of the solid line, III, separate impulses (dotted) may be used.

shows a method of getting a graduated result by successive small impulses of the "all-on" position of the electrical device.

Is the Furnace to Burn Fuel or to Make Steel?

SOME confusion of thought was noted in what is wanted of a control device in an open-hearth or other metallurgical furnace. Fuel engineers, without adequate knowledge of the metallurgy required of such a furnace, look only to the efficiency of burning the fuel, and getting out of it every last heat unit which can be wrung from it. Metallurgical engineers, on the other hand, who are charged with the duty of making a steel which will stand certain tests and pass specification requirements, see the matter in a different light.

Along the latter line Mr. Conlee stated that what is wanted in furnaces is not only control of the high temperature, but also control of the atmospheric characteristics, whether this atmosphere be neutral, oxidizing or reducing, and to a definite extent along the two latter lines. Especially in the open-hearth furnace is this

on a furnace show usually that an excess of fuel is being used. Thus, they show the possibility of cutting the fuel consumption materially.

Unfortunately, there is much uncertainty introduced because of the condition connected with the secondary air of combustion. Air is coming into the furnace on all sides, and this is not measured, and in the nature of things cannot be measured. Only when there is full control of the entire air can there be adequate control of combustion conditions.

No automatic device, in the opinion of this speaker, can take the place of the skilled judgment of a competent operating man. The automatic device, even where installed under good conditions, takes much intelligence in controlling it to fit into the varying operating conditions encountered from day to day or hour to hour.

Analysis of exhaust gas provides valuable information, but it is not an accurate measure of what is being done. It does, however, furnish an indication of the direction in which changes in practice should be made. Oxygen meters are coming into prominence. This speaker believes that they will be much better guides than

the carbon dioxide meters which have been available for some years.

Two Main Lines of Savings

WHAT can be expected from open-hearth control was brought out by Mr. Dickey under two heads. He said that the two large savings at present feasible have to do with reduction in the fuel cost and reduction in the cost of maintenance of refractories. There must be good control as to the pressure in the furnace if infiltration of air is to be avoided. However, unless this pressure is moderate, gas will blow out at the doors, and unless there is good control, this immediately leads to high cost for refractory maintenance.

Control of combustion, therefore, gives a bigger gain for relatively small expenditure than can be had in any other way. This control cannot well be made through the flue gas analyses, as this forms a poor gage from which to work and varies greatly with different fuels. This matter was shown by a slide thrown on a screen. Stratification makes it hard to get a satisfactory average sample from these gases at any point where the analyses would have much meaning.

Let the Man See His Results

A plea was made by this speaker to let the operator have the records of performance by the hour. He showed on the screen a circular chart drawn automatically by a recording instrument, in which a blue line showed the air flow and a red line the oil flow. These two graphs were superposed one upon the other on scales in which the two were about together for correct conditions. Thus, when they were apart to any extent it showed a condition of inefficiency, and indicated roughly the extent of loss.

Using this method, the operator can see all the time what he is doing. He can check it up against his results along other lines and know how to correct if any trouble is experienced. Good results he can repeat through intimate knowledge of how they were obtained. Without such an adequate

record, he is lost when it comes to a repetition of results.

Direct Control Electrically

IN making a plea for electrical control, W. H. Shallcross admitted that, as between this and mechanical control, it is often a matter of taste. If, however, an electric motor is utilized to actuate an oil pump, or any other hydraulic method of control, why not have it operate the control directly? He reported finding little difference in cost between electrical control and mechanical control.

On this matter of cost, however, he stated that a simple but rugged equipment may cost about as much to build as a delicate and complicated one. The reliability of the former, however, would naturally lead to its adoption. Controls of the types required for open-hearth furnace work cannot be supplied on a mass-production basis, like the Ford car.

Opposed to this advocacy of electrical control, R. W. Simpson spoke in favor of mechanical control. "Until we can find means," he said, "to drive electrical equipment as well as we can mechanical equipment, it is better to use the mechanical equipment for the severe type of operation involved in open-hearth practice."

Changes in Reversal Methods

BOTH speakers from the Leeds & Northrup Co. favored electrical control, whether through the use of push-buttons, or through automatic control with push-buttons in the circuit for special purposes. Mr. Bradley contrasted (1) the old method of reversing the open-hearth furnace through the use of a large amount of muscular effort on a heavy lever, with the next step in the shape of (2) hydraulic power to effect the reversing, making a much easier task on the part of the operator in moving a small lever, but with the not infrequent failure of hydraulic power to function adequately, and then with the (3) electrical arrangement, whereby the operator pushes a push-button and the motor does the rest.

Talking from a paper read in May

before the American Iron and Steel Institute, Mr. Bradley spoke of three main factors in combustion control, particularly as affecting the heat input. From the paper quoted, he showed that the fuel provides 72.7 per cent of the heat put in, chemical reactions provide about 10.6 per cent, and the pre-heated air 16.6 per cent. The rate at which the fuel is burned was stated as very important. It determines the furnace temperature and through this the rate at which heat is transferred to the bath and the steel is made.

Saving 72 Min. of Active Time a Day

Reversal of the furnace manually was said to require from 55 to 58 sec. under good operating conditions. Electrical reversal, based automatically on temperature difference in the furnace flues, accomplishes the same result in 11 sec., on the average. Estimating the average at four reversals an hour, this figure means that, with manual reversing, fuel is off the furnace about 90 min. in each 24-hr. day. Against this, it is off only 18 min. with electrical reversal, thus giving 72 min. or nearly one and a quarter hours more of fuel burning in a day.

In 72 min. a large furnace may be supplied with 80,000,000 B.t.u. in fuel and other heat input. This would result in a much faster heat and better operating conditions for the furnace. Radiation losses go on all the time, whether fuel is being burned or not.

Flexibility of Electric Installations

An engineer of the General Electric Co. told of installations his company has made in a number of industries in which as good control is made electrically as can be made mechanically, not only as to dependability but also as to gradations of control.

Mr. Shadgen made a strong plea for the adoption of the term "machine control" instead of automatic control. Metallurgical considerations require changes from time to time in operating conditions which no automatic control system can adequately accomplish. Machine control, however, under the supervision of a skilled man,



can do this and the term thus is a more accurate one.

Making Steel Can Never Be Automatic

A designer who has assisted in the recent installation of a large number of 150-ton open-hearth furnaces (these point to the Illinois Steel Co., although the name was not mentioned) expressed the belief that infiltration of air into the furnace laboratory may be regarded as a thing of the past. We are working now with a definite although small measure of forced draft, by putting pressure on the furnace. There is thus no opportunity for air to leak into that part of the system. In the 14-furnace plant to which he referred, draft control and pressure control for the fuels was put on, together with indicators to show

what was being done. Very definitely, however, interlocking of air and fuel was avoided.

Making steel, the speaker said, is an art. It must be so recognized. It never can become an automatic process. There are too many undetermined variables in it, entirely aside from the question of combustion.

He told of the general satisfaction 15 years ago with making steel on the basis of using 6,000,000 B.t.u. for each ton of ingots. A furnace to which he referred has recently shown, for a 13-month period, an average consumption of only 4,400,000 B.t.u., and without any waste-heat boilers in use. Another similar recent furnace, using waste-heat boilers but with a shorter run to its credit, has been operating at a little more than 4,000,000 B.t.u., after receiving credit for the heat used in the boilers.

Steel Mill Lubrication Is Making Strides

LUBRICATION was the subject of discussion at two sessions of the Lubricating Engineering division at the convention of the Association of Iron and Steel Electrical Engineers in Cleveland, June 15-19. The interest being taken in lubrication was indicated by a good attendance at the meeting and the discussions that followed the presentation of the papers. The meeting was presided over by C. C. Pecu, lubrication engineer, Bethlehem Steel Co., Lackawanna, N. Y.

Data gathered through a questionnaire covering steel plant lubrication were embodied in a report submitted by the association's general lubrication committee. This committee found that roll neck lubrication is the outstanding problem in steel plant lubrication. The report indicated lack of uniformity in the kind of grease used, types of scale guards and also in the types of bearing grooves.

Differing Practices Reported

Most mills, the committee reported, use a lead-base bearing metal with bronze inserts of different design. Some of these insert strips are simply bronze strips extending over the radius of the collar. Others are cast solid, the bronze acting as a thrust collar with two or three longitudinal strips bound together at the outside end. Many mills use a solid brass bearing and others a solid babbitt metal bearing. Makers of babbitt and bronze metals are improving their product by bringing out heavy-duty metals. Anti-friction bearings are used in many plants and are proving satisfactory under most trying conditions.

Many kinds of scale guards are used. In larger mills a circular cast guard is used but for smaller mills the guard is made of plate. All the guards are flanged out to fit the ra-

dus of the roll neck. Many types of grooves for bearings are used for forced greasing system.

Various factors that hinder good lubrication, such as poor water conditions, were brought out by the questionnaire. It was found to be the common practice to babbitt bearings on a mandrel, leaving the bearings very uneven when first put into the mill and resulting in improper functioning of the lubricant when the bearing is first used. It is the aim of mill operators to do everything possible to perfect lubrication.

Automatic Devices Find Favor

During the last two or three years several automatic greasing devices have been brought out, all rendering good service in reducing grease consumption and at the same time saving in time that is lost in shutting down the mill for greasing. It was pointed out that the safety factor is an important item in favor of greasing devices. Men avoid hazards in connection with greasing and do not ruin their clothing.

It was recommended that makers of lubricants install equipment to test their products properly before offering them for sale.

In conclusion, the committee reported that the grease manufacturers must develop new greases and special greases to meet all conditions. Makers of automatic grease systems are constantly endeavoring to improve their equipment. The two greatest drawbacks to automatic pressure systems, the committee found, are the caking of grease in the systems and the presence of small particles of dirt in the grease. The first objection can be remedied by the grease manufacturer but the second is almost wholly up to the operator.

The general lubrication committee announced that it had formed a lubrication and device development committee, to look after new developments in the lubrication field. This will be composed of manufacturers of lubricants and lubricating devices.

Minimizing Spoilage from Dripping Grease

A PAPER of particular interest to operators of sheet mills on "Spoilage of Material Due to Grease Dripping from Overhead Traveling Cranes" was presented by T. J. Flaherty, electrical superintendent, American Rolling Mill Co., Ashland, Ky. Calling attention to the extreme care required to prevent damage to highly finished sheets during the manufacturing processes, and to the desire to keep rejections at a minimum, the speaker said that damage due to drippage is very troublesome because the grease is rolled into the sheets and the rolls are apt to be damaged at the same time. The result is the production of stained sheets and this is especially objectionable if they are to be enameled or painted.

The speaker said that if stained sheets are pickled the grease flows off and collects on the top of the bath, not being soluble in the solution. As a result some clean sheets may pick up the grease. When grease stains are imbedded in the sheets, the only way to remove them is by re-enameling and repickling.

Overhead Cranes Are Bad Offenders

Dropping of oil and grease from overhead cranes, the speaker said, is a constant source of spoilage of highly finished sheets unless guarded against. The development of anti-friction bearings, together with the progress grease and oil companies have made in producing lubricants that are practically non-flowing within wide temperature limits have done much toward eliminating dripping of lubricants from cranes.

If there is a perfect bearing fit in the common type of sleeve bearings, and a faultless method of applying lubricants, excessive lubrication will be eliminated and drippage would not be a problem. However, as such conditions are not attainable on most cranes, methods must be devised to prevent drippage.

Formerly one grade of grease and possibly two grades of oil were used in crane lubrication, regardless of the type of work. Higher crane speeds and heavier cranes and less time available to apply lubricants have led to new types of oil, grease and bearings to meet more exacting demands. Various methods have been used to prevent drippage, usually the provision of drip pans or waste to take up the excess lubrication. However, these constitute fire hazards.

While much has been done in his company's plant to eliminate grease

and oil drippage, the speaker said that they had not been eliminated entirely. Some cranes have been fully and others partially equipped with roller bearings, and some of the older installations have sleeve-type bronze bearings on the shafting and M. C. B.-type track-wheel journals on the end truck. Roller-bearing cranes give little trouble, as they are practically oil tight.

Holding Grease to Its Work

This company has eliminated the use of waste for some of the cranes equipped with M. C. B. journals, and has used semi-solid grease, which has given good results. The chief objection, he says, is that it is necessary to punch up the grease frequently to make it come in contact with the axles. A method has been devised which has proved successful in holding the grease in contact with the axles by springs. This eliminates the necessity of punching up the grease every 8-hr. turn. A test showed that the crane was well lubricated 30 days without punching up the grease or adding additional grease.

The speaker referred to difficulty in preventing cable dressing from dripping from hoist cables. On some cranes no cable dressing is applied, although this probably shortens the life of the cable. He said it is difficult to control leaking of grease from the gears, and the only remedy found is to provide gear cases as near leak-proof as possible.

Motor bearings leak considerably, especially if the overflows do not have oil-tight covers. For motor bearings in back axles this company is now using semi-solid grease instead of oil. On hook blocks equipped with sleeve-type bearings a pressure method is used, of applying a not too fluid type grease. When this is applied frequently, and only in small quantities, drippings from this source are at a minimum.

Chairman Pecu stressed the importance of proper methods of lubrication, both from a safety standpoint and from the effect it has on the employees. If the mill is kept a clean place in which to work, he said, it improves the morale of the men.

Machine-Tool Lubrication

LUBRICATION and its application to machine tools was discussed by J. H. Van Campen, chief engineer, Republic Steel Corp. The importance of proper lubrication of the present high-production machine tools cannot be over-emphasized, he declared. He referred to lubrication as a branch of industrial economics, saying that production is contingent on machine efficiency, which in turn is contingent on proper lubrication. Most maintenance and repair costs can be traced to lack of proper lubrication.

He described the usual methods of machine tool lubrication. Referring to pressure grease systems for use on

such machine tools as power presses, he said that the hand-pressure type is perhaps the more suitable for the use of the individual machine operator. But in large installations, where considerable equipment may be involved, the power lubricator will often be a time and labor saver. The trend toward the adoption of anti-friction bearings has led to a study of the problem of lubricating this type of bearing.

Favors Extension of Automatic Devices

The speaker believes that a wider adoption of automatic and semi-automatic systems can be used in the application of greases, particularly where a number of points are to be lubricated, some of which may be in

inaccessible or hazardous points of the machine. He pointed out as advantages of the pressure grease system that, with this system, the machine can be greased while in operation, while preventing the danger of the accidents involved in applying lubricant manually.

Lubrication of electrical apparatus used in steel mills was discussed in a paper by J. L. Brown, chemical engineer, Westinghouse Electric & Mfg. Co., and lubrication of turbo-generators by James L. Roberts, assistant installation engineer, turbine department, General Electric Co. Testing of lubricants was the subject of papers by Frank L. Gray, lubrication engineer, Illinois Steel Co., and E. S. Glauch, mechanical engineer, Joseph Dixon Crucible Co.

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Steel Mill Equipment Shown in Cleveland

The exhibit of steel mill equipment held in connection with the Association of Iron and Steel Electrical Engineers in Cleveland last week was an interesting and comprehensive display of a wide variety of mechanical and other equipment of the latest type used in steel plant operation. The exhibit attracted a good attendance of steel plant operating men, engineers and others. The exhibitors were about 125 in number.

Electrical equipment occupied a prominent place among the exhibits. This included motors and various types of control apparatus. A new type of mill control was shown that was designed to provide a closer and simpler control of mill rolls, make work easier for the operator and to cut out the element of error. Controls of various operations are grouped in eight single-pole master switches occupying a space only about 20 in. wide, permitting the mill operator to control all operations from one point in the pulpit. There was shown also a new type of high-speed relay.

Numerous displays of control equipment included switches, circuit breakers, motor controls, steel mill controllers and contactors, a dynamic braking stop control for traveling cranes, a control for regulating the hot-blast temperature of a blast furnace, automatic controls for open-hearth furnaces and pyrometers. One of the recently developed control devices shown was a pneumatic cycle controller equipped with diaphragm valves. This automatic control apparatus is being used in the manufacture of automobile tires but is expected to have other fields of usefulness, also.

Lubrication Attracts Notice

There were several exhibits of pressure systems of lubrication, and the interest these drew indicated that improved lubrication is a matter that

is being given considerable attention. A new design of one system making it applicable to machine tools was exhibited.

Attractive exhibits of anti-friction bearings were displayed by a number of manufacturers. Included were some of the largest bearings made for steel mill service.

The wide scope of the exhibit was indicated by the displays mentioned and, in addition, exhibits of mill rolls, speed-reducing gears, bearings, welding apparatus, welding wire, hoists, industrial lights, valves, cranes, models of other mill handling equipment, heating units, an air filter, lubricants, and a new type of insulating material with a vegetable oil base for use in lifting magnets.

Equipment used in the wire-manufacturing industry was shown in a separate exhibit. This included wire-drawing machinery, some in operation, die recutting and polishing machines and various alloys used for drawing dies. Reels made of welded steel sections for handling telephone wire and power cable were among the exhibits. These, a recent product as a substitute for wood reels, provide a new use for steel.

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Although the second arc welding contest prize competition sponsored by the Lincoln Electric Co., Cleveland, does not close until Oct. 1, entries to date have been received from 13 foreign countries, in addition to those from American designers. In this contest, 41 prizes totaling \$17,500 are offered for papers describing the design or redesign of products to be fabricated by arc welding.

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Eaton, Rhodes & Co., Cincinnati, have been appointed exclusive agents of the Globe Iron Co., Jackson, Ohio, in a district comprising parts of Ohio and Indiana.

Prizes Awarded for Best Industrial Advertising

The ninth annual conference of the National Industrial Advertisers Association was held at the New Yorker Hotel, New York, June 15, 16 and 17. There were three general and three departmental sessions, at which prominent leaders both in industry and business discussed the functions of industrial advertising and sales promotion in distribution. Among the speakers were Paul T. Cherington, director of research, J. Walter Thompson Co., New York; Carle M. Bigelow, president, Bigelow, Kent, Willard & Co., Boston; Edward R. Dewey, chief of industrial statistics, Bureau of Census, Washington; Virgil Jordan, economist, *Business Week*; George H. Corey, advertising manager, Cleveland Twist Drill Co., Cleveland, and president of the National Industrial Advertisers Association, presided.

One of the interesting features of the convention was an exhibit of industrial advertising. This comprised 250 separate panels, each displaying a campaign of advertising for some product or service. These panels were furnished by the leading advertisers throughout the country. The exhibits of the association's active members were grouped into eight divisions. In each division there were awards for the best work exhibited, the awards being made by a disinterested jury appointed by the president of the association.

The award winners and the divisions under which each award was made are as follows:

Division A—Best exhibit of industrial advertising, judged on the basis of meeting and defeating a definite problem.

First Prize—Silver Cup: Linde Air Products Co.

Honorable Mentions: Timken Roller Bearing Co., Jenkins Brothers, Bakelite Corp.

Division B—Best publication campaign, judged on the basis of carrying out a central sales idea.

First Prize—Silver Cup: Nash Engineering Co.

Honorable Mentions: Republic Flow Meters Co., United Chromium, Inc.

Division C—Best direct mail, judged on the basis of carrying out a central sales idea.

First Prize—Bronze Trophy: S. B. Warren Co.

Honorable Mention: Link-Belt Co.

Division D—Best publication or direct mail, judged on its presentation of the company's facilities, personnel, and general publicity.

First Prize—Silver Cup: John A. Roebling's Sons Co.

Honorable Mention: M. W. Kellogg Co.

Division E—Best news exhibit of one or a series of advertisements featuring news.

First Prize—Silver Cup: Cleveland Twist Drill Co.

Division F—Best performance exhibit of one or a series of industrial advertisements featuring performance.

First Prize—Bronze Trophy: United States Pipe & Foundry Co.

Honorable Mentions:—Halowax Corp., Bakelite Corp.

Division G—Best Typography exhibit of industrial advertising. This award was open to both active and associate members.

First Prize—Bronze Trophy: Barber-Colman Co.

Honorable Mention: Rickard & Co., Inc.

Division H—Best illustration of art work and photographs in industrial advertising shown in the finished advertisement.

First Prize—Bronze Trophy: Fafnir Bearing Co.

Honorable Mention: John A. Roebling's Sons Co.

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S. A. E. Names Officers for 1932

Arthur J. Scaife, consulting field engineer, White Motor Car Co., Cleveland, has been nominated president of the Society of Automotive Engineers to succeed Vincent Bendix, president Bendix Corp., according to an announcement made at the summer meeting of the society at White Sulphur Springs, W. Va., last week.

Vice-presidents named to represent the various divisions are: W. B. Stout, Stout Engineering Laboratories, Dearborn, Mich., aircraft engineering; C. L. Lawrance, Lawrance Engineering & Research Corp., New York, aircraft engine engineering; A. J. Poole, United American Bosch Corp., New York, Diesel engine engineering; B. B. Bachman, Auto-Car Co., Ardmore, Pa., motor-truck and motor coach engineering; D. G. Roos, Studebaker Engineering Corp., South Bend, Ind., passenger car engineering; A. J. Neeken, Hupp Motor Car Corp., Detroit, passenger car body engineering; A. S. McArthur, Toronto Transportation Commission, Toronto, Canada, transportation and maintenance engineering; and J. E. Padgett, Spicer Mfg. Co., Toledo, Ohio, production engineering.

New councilors will be: H. T. Woolson, chief engineer Chrysler Corp.; R. D. Wilson, member of the board, Standard Oil Co. of Indiana; and S. O. White, chief engineer Warner Gear Co. John A. C. Warner, with headquarters at 29 West Thirty-ninth Street, New York, continues as secretary and general manager.

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A summer conference course in industrial relations will be given at Princeton University Sept. 21-26 under the auspices of the industrial relations section of the American Management Association. J. Douglas Brown, Princeton University, Princeton, N. J., is director of the industrial relations section.

Malleable Iron Research Meeting This Week

The June quarterly meeting of the Malleable Iron Research Institute will be held at the Stevens Hotel, Chicago, June 26. The following program has been arranged:

Qualities of Malleable Iron and Checks on Test Bars, Enrique Touceda, consulting engineer.

Research Activities, Ralph J. Teetor, chairman research committee.

Cooperative Research and Shop Practice Meetings, Harry W. Highriter, shop practice engineer.

More Malleable Iron for the Automotive Industry, L. D. Harkrider, chairman of committee to promote sales of automotive malleables.

Field for Malleables in Miscellaneous Industries, Ralph N. Cole, chairman, Western section, F. M. Metcalf, chairman Eastern section committees to promote sales of miscellaneous malleables.

Value of Cooperation in Sales Promotion, E. E. Griest, chairman, committee to promote sales of railroad malleables.

Industry Statistics, Robert E. Belt, secretary-treasurer.

The Malleable Industry, Herman H. Lind, general manager.

Following the meeting there will be a luncheon, at which Dr. Frank M. Surface, assistant director, Bureau of Foreign and Domestic Commerce, Washington, will deliver an address.

The meeting will adjourn to a meeting of the American Society for Testing Materials, at which a symposium prepared by the society and the American Foundrymen's Association on malleable iron castings will be presented.

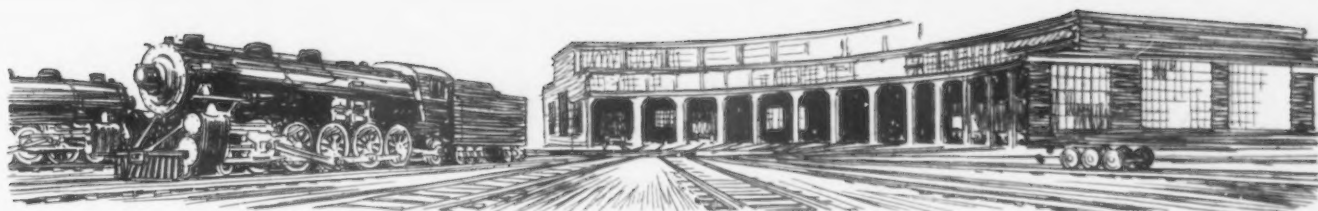
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Chicago Group Visits Cincinnati Plants

About 250 members of the Chicago Superintendents and Foremen's Club visited the plants of the Cincinnati Milling Machine Co., Cincinnati Grinders, Inc., and the foundry division of these companies in Cincinnati on June 6. They went to Cincinnati on a special train. Among the Chicago companies represented were the following: Goodman Mfg. Co., W. A. Jones Foundry Co., Addressograph Co., Acme Steel Co., Teletype Corp., Continental Can Co., Foote Bros, Inc., International Filter Co., Kellogg Switchboard Co., Link-Belt Co., A. Finkl & Son, H. M. Caldwell Co., Whiting Corp., A. B. Dick Co., Gears & Forgings, Inc., Mercury Truck Co., Shafer Bearing Corp. and Simonds Saw & Steel Co.

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The year book of the American Bureau of Metal Statistics, eleventh annual issue, 1930, has recently appeared, and its 126 pages contain the usual valuable data on copper, lead, zinc, gold and silver in the United States and other countries.



Action on Railroads' Plea for Higher Rates Being Expedited

Carriers Asked to Submit Bill of Particulars Within 15 Days on Products to Be Included

WASHINGTON, June 23.—Action on the petition of railroads for a 15 per cent increase in freight rates is expected to be considerably expedited as the result of the request of the Interstate Commerce Commission that the roads submit a bill of particulars as to the products they propose to include and those which will be specifically excepted. Reply to this order of the commission, determined upon last Friday, was called for within 15 days.

The carriers were asked to say particularly whether they are prepared to make increases in all existing freight rates on iron and steel products, non-ferrous metals, agricultural products, including livestock, lumber, automobiles, petroleum and class rates. If they do not propose to make increases in all rates in these groups, the railroads are required to state those they propose to make.

The purpose of the commission is to speed up the hearing, though not with undue haste, by having the traffic departments of the railroads indicate clearly the rates to be increased and those which are not to be affected. This will automatically, by a process of elimination, make it unnecessary for potential protestants to prepare material which will not be involved in the proceeding. Likewise, it will save such shippers much time and expense if informed that rates, or at least a portion of rates, in which they are interested are not to be changed, even if increases were authorized by the commission.

Partial Relief, at Least, Expected to Result

The commission confined itself to its formal order, which has been given varying interpretations. By some it was seen as a favorable sign for the railroads, looking to at least partial granting of their request for increased rates. Others saw in it an implication that increases, if allowed, would be rather sharply curtailed. Perhaps the general studied view is that the commission is calling upon the railroads to bring the case to its

actual merits as seen by the carriers at once and to eliminate extraneous matter.

The fact that the commission specified iron and steel, non-ferrous metals and other products, together with class rates, in asking whether it was proposed to revise all existing rates in these groups is obviously held to be significant. Rates on all of the products named have been decreased or decreases have been sought, the latest example being the request of the carriers to cut short-haul rates on iron and steel products.

Evidently the commission wants to

Rate Application Finds Supporters in Industry

The application of the railroads for a 15 per cent advance in freight rates has not been unfavorably received by manufacturers in the iron, steel and metal-working field. While it would be beside the truth to say that there is no opposition to higher rates, many manufacturers have expressed their willingness to accept advances and others are openly indorsing the move of the carriers, believing that aid to our transportation system is a prerequisite to business recovery.

Even those favoring the advance, however, doubt whether advances averaging 15 per cent will be granted by the Interstate Commerce Commission. One leading executive believes that rates may be revised upward to the extent of about 10 per cent, which he estimates would raise steel-making costs about \$1 a ton. Such an increase in costs, in his opinion, would soon be reflected in a strengthening of steel prices.

Opinion in Pittsburgh and Youngstown is rather generally in favor of an increase in rates. The competitive situation, it is believed, would remain largely unchanged, as advances would

know whether, in the face of these reductions and proposed reductions, the carriers, both rail and connecting water lines, intend to retrace their steps and ask for increases. It is manifest they do not propose to increase some rates, but to leave reduced rates in effect where motor truck and other competition is held to make this necessary. The commission also asks the carriers to inform it if they intend to increase international rates, reference being to joint rates with Canadian and Mexican lines.

Supplementing the petition filed with the Federal commission, the railroads will also file petitions with State commissions, seeking increased intrastate rates.

Among the numerous protests received by the Interstate Commerce Commission against increased rates have been some from State commissions, which are protesting especially against higher rates on agricultural products. The Federal commission has announced that a committee representing State commissions will sit with the former at the hearings.

be effective on both incoming and outgoing materials. There would be increases in the cost of assembling ore, limestone and scrap, but the transportation of coal would be unaffected for those companies which move their fuel by water.

Manufacturers canvassed to date in the Chicago district are also in sympathy with the move of the carriers, feeling that a rate increase would stimulate railroad buying, possibly by late autumn. Less unanimity of opinion is found in Cleveland. However, supporters of the plan in that center argue that higher rates, if granted, will lead to advances in prices of pig iron and steel, because of the higher costs of handling ore, coal and coke. Even the possibility of such price increases, in their view, would stimulate buying, causing consumers to put in stocks of pig iron and steel before the rate changes went into effect.

Similarly, they state, the movement of ore down the Lakes would be accelerated, as users would want to put as much ore in their furnace yards as they could reasonably handle while existing rates were still in effect. From 65c. to 80c. a ton will be added to the cost of making pig iron at Lake furnaces if the 15 per cent rate advance is granted, according to the estimates of pig iron producers.



Mechanical Improvements Usher in Automobile Selling Campaigns

DETROIT, June 22.

ALTHOUGH automobile output continues at a rate which seems to assure a minimum assembly of 270,000 cars in June, there is little in the current situation to give encouragement to the steel trade. Steel tonnage from this district has been relatively slim, with no improvement expected for 30 to 60 days. The seasonal decline in steel orders from the automobile industry has been accentuated by the agreement of Buick and Studebaker to refrain from bringing out new models in midsummer as they have in previous years. While the volume of business placed by these two makers at this time of the year did not approach that from the important low-priced producers, nevertheless it always served as a stop-gap during a normally dull period.

Automobile executives are of the opinion that July will be the poorest month for sales during the summer season. Shortly after that will come the harvesting of crops; it is on this event that hopes are pinned for at least a moderate revival in retail trade, as the agricultural sections, particularly through the Middle West and South, will again have some money to spend. Some manufacturers have been cheered by the fact that retail sales early this month showed a slight gain over those of the latter part of May, but they have slight hope that these increases can be held.

In respect to the enthusiasm and energy which it is throwing into its selling campaign just now against a multitude of discouraging factors, the motor car industry is setting an example which might well be followed by other industries. Chevrolet is aiming at a goal of 1,000,000 demonstrations to prospective customers this month, a leading truck maker is pledging dealers' salesmen to make an

New four-cylinder Plymouth, with vibrationless motor and free wheeling, is center of attention. Plymouth's June output may be 11,000 cars, July 15,000.

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Packard is offering straight-eight models, with longer wheelbase, lower body, slanting windshield, Vee-type radiator, heavier frame and built-in system for adjusting shock absorbers. Graham-Paige adds free-wheeling as optional equipment.

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Steel specifications slim and no improvement expected for 30 to 60 days.

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Despite the handicap of numerous unfavorable factors, automobile industry is setting pace for other industries by making an intensive drive for business.

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elaborate presentation of the merits of its product to four prospects a day during a 90-day whirlwind campaign, and at least two companies have been conducting regional sales meetings for distributors and dealers throughout the country preparatory to intensive selling activities during the summer in an effort to maintain business at as high a level as possible.

Moreover, new cars and improvements of existing models loom on the horizon in profusion. Early in July Chrysler will introduce a new Plymouth, which already is being more talked about than any previous car in

Plymouth's history. Tomorrow Packard will announce a new eight and before the month is out Nash will present four new cars. Ford has put on the market a convertible sedan and cabriolet in the body designs carrying slanting windshields and larger interior space, these two models taking their place alongside the town sedan, de luxe sedan and standard sedan, all of which have been added to the Ford line in the past few months.

New Plymouth Bids for Low-Priced Trade

PROBABLY the greatest interest at the moment centers in the Plymouth. It is well known that Mr. Chrysler has long wanted to offer a car which could compete to better advantage with Ford and Chevrolet. To this end Chrysler engineers have been laboring for months on a new Plymouth, with the result that the forthcoming models will have a four-cylinder engine made vibrationless by a two-point suspension scheme, and also will possess free wheeling. It is understood that the cars can be changed from free wheeling to conventional gear shift by pulling a knob on the dashboard. The introduction of the Plymouth will be accompanied by probably the largest advertising and merchandising program ever attempted by Chrysler. One selling and publicity feature is said to be a blind-fold test, by which a prospective customer is driven around in a new four-cylinder Plymouth, a six-cylinder car and an eight-cylinder car. The challenge is made that he cannot tell from the ease of riding which car is the Plymouth, despite the fact that it is a four-cylinder car, because of its vibrationless motor.

Announcement of the Plymouth definitely puts the Chrysler Corp. in the position of trying to strengthen its

hold as the industry's third largest producer and to get a bigger share of the business in the low-priced field. Plymouth has made two heavy increases in manufacturing operations this month. It is understood that output in June may run as high as 11,000 cars, with 15,000 scheduled for July. The factory is now employing 7500 men, against 4500 a month ago, and 2000 more men will be added by the end of the month. Plymouth will continue to be marketed through Chrysler, Dodge and DeSoto dealers.

Ford Motor Co. Buys Steel for July Shipment

SPECULATION concerning the plans of the Ford Motor Co. has not abated. It made its regular monthly purchase of steel for July delivery the past week, which seems to put to rest reports that the Rouge plant will be shut down early in July. However, the total steel volume contracted for was considerably less than in either April or May, and it will be remembered, in turn, that those two months brought far less tonnage than the earlier months of the year. Current factory employment by the Ford company, including the Lincoln division, is around 86,000 men, despite stories about extensive layoffs. Assembly of cars continues at approximately 7000 units three days a week, which points to a total production this month of at least 85,000 units. Output of motors, however, is little more than half of the number of cars being assembled, as a substantial reserve supply of motors has been built up in recent weeks.

The vast extent to which the Ford Motor Co. contributes to Detroit's industries is shown in a statement issued at Dearborn last week. Total Ford expenditures in 1930 in the local metropolitan area were \$374,000,000, of which \$210,000,000 was spent for materials, supplies, construction and miscellaneous services purchased from more than 450 Detroit firms. The company paid \$159,000,000 in salaries and wages and an extra \$1,500,000 in interest on approximately \$19,000,000 deposited by employees in the Ford investment fund.

Among Detroit firms whose Ford orders range from one to several million dollars are the Ainsworth Mfg. Co., American Brass Co., Bower Roller Bearing Co., Briggs Mfg. Co., Budd Wheel Co., Detroit Gear & Machine Co., Essex Wire Co., General Spring & Bumper Co., Kelsey-Hayes Wheel Corp., Long Mfg. Co., Michigan Steel Corp., Motor Products Co., Murray Corp., Timken-Detroit Axle Co., United States Rubber Co. and L. A. Young Spring & Wire Co. Pistons were supplied by Bohn Aluminum & Brass Corp., carburetors by Holley Carburetor Co. and Zenith-Detroit Corp., gaskets by Detroit Gasket & Mfg. Co. and McCord Radiator Co., valves by Wilcox-Rich Corp. and Scott Valve Mfg. Co., and clutches and

crankshafts by Continental Motors Corp.

Packard Brings Out Many Mechanical Improvements

PACKARD has retained the straight eight engine in its new cars which are larger with wider tread and longer wheelbase. Synchronizers have been added to the four-speed transmission so that gears can be changed quickly and noiselessly. A built-in shock absorber adjustment system, controlled by pushing or pulling a knob within reach of the driver, is an innovation which makes possible "snugging up" tightly the shock absorbers when the car is driven at high speed on the open road and freeing them for city driving. The engine is "floated" in rubber to obtain quiet operation. To do this in the longer wheelbase and heavier cars and still avoid front-end weaving, Packard has invented a new stabilizing device, consisting of a metal spool mounted between heavy springs in a cylinder which is placed at either end of the front bumper. This device dampens any movement of the radiator and lamps and stabilizes the whole front end of the car at all speeds. All cars are 1 in. lower than formerly, this being accomplished by dropping the frames 1 1/4 in., the other three-quarters of an inch being added to the thickness of the body sills. Vee-type radiators, slanting windshields and longer hoods are among other changes. The frame has been strengthened with a built-up box section cross-piece at the front and an X-shaped cross member in the center. There are four different chassis, the five-passenger sedan being mounted on the 129 1/2-in. wheelbase and other standard models on a 136 1/2-in. wheelbase. The de luxe models have chassis with wheelbases of 142 1/4 in. and 147 1/4 in. Two new body types, a victoria and a long wheelbase five-passenger sedan, have been added to the standard line, and the victoria to the de luxe line. In both lines the runabout has been superseded by a coupe-roadster.

In regard to retaining the eight-cylinder engine, Col. J. G. Vincent, engineering vice-president of Packard, states that "we gave the question of engine type the most intensive study. All of our research and testing, both in the laboratory and at our proving ground, brought us right back every time to the straight-eight engine."

If Chrysler's judgment in holding to a four-cylinder engine and Packard's in continuing the straight eight can be considered an indication of what the industry as a whole is thinking, it appears that a halt is being called on the craze for multiplying the number of cylinders. The discussion of 12-cylinder and 16-cylinder cars has subsided. Experience of manufacturers with the low-priced eight has not been happy and there still seems

to be a place for the medium-priced as well as the low-priced six.

Graham-Paige has announced free wheeling as optional equipment at a small extra cost on its three-speed Prosperity Six and its four-speed models. The company declares that its cars are the only ones on the market combining synchronized shift four-speed transmission with free wheeling. So many manufacturers are said to be putting free wheeling into the optional rather than standard equipment class because there are hilly or mountainous parts of the country where free wheeling cannot be used with safety.

Almost concurrent with a published report intimating that the LaSalle might be dropped from the Cadillac family appeared an advertisement of the Cadillac Motor Car Co. the past week, signed by President L. P. Fisher, stating that the LaSalle, Cadillac V-8, Cadillac V-12 and Cadillac V-16 will all remain as members of the Cadillac family.

Labor Turnover Shows Unfavorable Rate

Turnover of labor in May is reported by the United States Bureau of Labor Statistics to have shown a considerably higher separation rate than the accession rate. Separations amounted to 3.83 per cent of the number on the payroll, against 2.79 per cent for accessions. The figures come from representative establishments in 75 industries, employing approximately 1,250,000 people.

Lay-offs constituted almost two-thirds of the separations recorded for the total group, and made up a larger amount than either voluntary quitances or discharges in every group considered individually. In the full list, lay-offs represent 2.43 per cent of the payroll, discharges 0.28 per cent and quitting 1.12 per cent.

Much variation is found from industry to industry. Three of the principal groups showed accessions greater than separations. These include boots and shoes, men's clothing and meat slaughtering. Iron and steel, with 1.57 per cent accession rate, was at the lowest point of all the groups, while its 3.18 per cent separation rate was lowest with one exception. Foundries and machine shops showed accessions of 2.44 per cent and separations of 5.93 per cent. Automobile manufacturing showed accessions of 3.41 per cent and separations of 4.86 per cent.

Total value of products manufactured in the United States in 1929 was \$70,137,459,352, against \$62,718,347,289 in 1927 and \$62,041,795,316 in 1919, an increase of 11.8 per cent over 1927 and of 13 per cent over 1919, according to the Bureau of the Census.

Industrial Executives Attend Short Course

Theoretical principles and practical problems of industrial organization and administration were studied by a group of executives at a course of review and instruction conducted from June 10 to 18 by the industrial engineering department of Pennsylvania State College, State College, Pa. Founded 16 years ago by Col. Hugo Diemer, now of La Salle Extension University, Chicago, this short course is said to be the only summer class schedule of its kind in the United States.

This year's course comprised lectures and informal conferences, as well as independent study of short texts and outlines of the subjects presented. It afforded the members an opportunity to review and organize their own knowledge of the practical aspects of production and administration problems, as well as learn of current developments in these fields.

Subjects taken up included the basic principles and laws of management, personnel problems and training, production control systems, time and motion studies, wage incentives, principles of factory layout, materials handling, engineering economy, cost systems and budgetary control. Formulas for determining economic lot sizes and for calculating economic purchase quantities were reviewed, and discussion of the economic factors involved in the selection and use of jigs and fixtures included existing formulas for determining the profit or loss accruing from such equipment.

Industrial economics in the broad aspects of national policies was dis-

cussed at one class period. A lecture on industrial training included description and meeting of the conference method of foremen instruction. In this informal round-table discussion the subject of discipline was considered, those present suggesting the various ways in which they, as foremen or superintendents, would have handled specific cases.

Prof. C. E. Bullinger, head of the industrial engineering department of the college, Prof. J. Orvis Keller and Prof. S. B. Colgate directed the instruction. Those attending the course included: E. L. Browe, Babcock-Wilcox & Goldie-McCulloch Co., Ltd.; Alex Brown, Hookless Fastener Co.; Lee Cyr, comptroller, Reading Iron Co.; H. C. Linderman, Westinghouse Electric & Mfg. Co.; J. A. McConnell, Eli Lilly & Co.; R. J. Craig and A. R. Vinton, Rochester & Pittsburgh Coal Co., and C. J. Bell, H. G. Bickley, Paul Bowman, T. A. Cook, E. J. Miller and J. F. Smith, representing various branches of the West Virginia Pulp & Paper Co.

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A new series of improved Tapalog recording pyrometers is announced by the Wilson-Macaulen Co., Inc., 383 Concord Avenue, New York. These new models are described as suitable for single and multiple records and represent extensive improvements in mechanical design over the old models. The new instruments are operated entirely by an industrial type synchronous electric clock motor, which operates on alternating current power from the lighting circuit or plant power. All models have automatic cold junction compensation. Catalog section N describes these models.

Wholesale Prices Drop Still Further

Index numbers of wholesale prices, which have been declining practically without interruption since July, 1929, went down further in May. The commodity index reported by the United States Bureau of Labor Statistics is 71.3, compared with 73.3 in April, and with 89.1 in May, 1930. The figure has been for some time the lowest reached since the change was made, basing the index on 1926 prices as 100.

Metals and metal products declined from 88.7 to 87.8 in May, owing very largely to a drop in non-ferrous metals from 65.1 to 60.6. Iron and steel was off from 87.5 to 87.2; agricultural implements and automobiles were stationary at 94.7 and 98.6 respectively. Other metal products dropped to 94.4 from 95 in April.

Except for hides and leather products, which remained stationary, every one of the major groups showed a decline, and most of them declined more than one point. Farm products and foods had the largest drop, about three points each.

Using the three classifications: Raw materials went down from 68.3 to 66.5; semi-manufactured articles from 71.1 to 68.9; and finished products from 77.1 to 75.1.

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Porter-Cable Machine Co., Syracuse, N. Y., has appointed the Vandyck-Churchill Co., of New York and New Haven, Conn., as its representative for the sale of lathes and milling attachments.

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EXHIBIT OF CHROME NICKEL STEEL

The illustration is part of an exhibit of Alleghany metal in a store window of the Empire State Building, New York, which includes samples of the alloy in the forms used for mullions and on the mooring mast, and examples of special products into which it may be fabricated. The fireplace overmantel is intended to demonstrate its use for decorative purposes when used in conjunction with bronze; a small modern lamp at the left shows it as the medium for small and intricate castings, part of a grille at the right shows the alloy wrought in forms usually associated with iron or bronze, and products on the floor of the window illustrate other forms to which it lends itself. About 275 tons of high chrome nickel alloy steel were used on the exterior of the Empire State Building, of which about half was furnished by the Alleghany Steel Co.

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PERSONALS

ALBION BINDLEY, who on July 1 succeeds ROBERT McMILLAN as purchasing agent for the Pittsburgh Steel Co., Pittsburgh, and subsidiary companies, as mentioned in THE IRON AGE of June 11, has been identified with the Pittsburgh company and affiliated organizations for nearly 20 years. He gained his early training at the Monessen, Pa., plant, and was serving as assistant superintendent of the tube mill at that point when he entered the Army in 1917. After the war he served for a time in the Pittsburgh sales organization of the Pittsburgh Steel Products Co. In 1923 he went with the Neely Nut & Bolt Co., Pittsburgh, as vice-president and secretary, holding that position until November, 1930. He has been a director of Pittsburgh Steel Co. since 1925.

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DR. EDWIN FITCH NORTHROP, research physicist noted for his work in the development of new methods and instruments for production and measurement of high temperatures, including the Ajax-Northrup high-frequency induction furnace, has been awarded the Edward Goodrich Acheson Medal for 1931 by the Electrochemical Society.

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THOMAS H. MORCOM, who has been assistant superintendent of the General Railway Signal Co., Rochester, N. Y., has been appointed factory superintendent, succeeding the late Frank H. Banner. Mr. Morcom entered the railroad field as piece work inspector for the Lehigh Valley, afterward becoming identified with the General Railway Signal Co. He has been with the latter continuously, except for a period during the war, when he was division superintendent at the United States Naval Gun Factory at Rochester. ROBERT H. PARKS, who has served the Signal company for some time, has been made assistant superintendent.

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R. D. BEAN, formerly manager of the engineering development department of the Brown Instrument Co., Philadelphia, has been made chief engineer. He has had extensive experience in field investigations covering applications of industrial measuring instruments.

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MAURICE TAYLOR, welding technician for the Lincoln Electric Co., Cleveland, sailed on June 20 for Tokio, where he will confer with officials in charge of ship construction for the Imperial Japanese Navy and super-



ROBERT McMILLAN

vice the installation of automatic welding machinery in the factory of the Kawasaki Dockyard Co. The welding equipment was sold to the Kawasaki company by T. Y. INAGAKY, Lincoln representative in Tokio.

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L. F. DELARGEY, formerly purchasing agent for the Wilcox Products Co., and for the past two years general purchasing agent for the Wilcox-Rich Corp., Saginaw, Mich., has been transferred to the company's general offices at 9771 French Road, Detroit.

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ALEXANDER L. FEILD, research engineer of the Simonds Saw & Steel Co., Fitchburg, Mass., has become, effective July 1, director of development and research of the Rustless Iron Corp. of America, Baltimore. Following his graduation from the University of North Carolina, he spent some time at the Pittsburgh Experiment Station of the United States Bureau of Mines. From 1917 to 1925, he was identified with several subsidiaries of the Union Carbide & Carbon Corp., New York. For the next two years Mr. Feild was with the Central Alloy Steel Corp. but returned to the Union Carbide company in 1927. He received the J. E. Johnson, Jr., award in 1923 for distinction in metallurgical research.

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E. E. GRIEST has been appointed vice-president in charge of manufacture of the Chicago Railway Equipment Co., Chicago.

CARL A. JOHNSON, president, Gisholt Machine Co., Madison, Wis., has been made chairman of the department of manufacture of the United States Chamber of Commerce.

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ROGER W. ANDREWS, assistant to the president of the Blaw-Knox Co., Pittsburgh, has been appointed vice-president and a director of the Blaw-Knox International Corp. He will make his headquarters in Paris and will be in charge of the company's European activities.

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A. B. ZERBY has been appointed manager of the printing bureau of the Westinghouse Electric & Mfg. Co., East Pittsburgh. The bureau is an innovation of the company and is expected to realize economies in analyzing printing requisitions from all sources. Mr. Zerby has been associated with the Westinghouse company since 1912, and since 1929 has been director of advertising production.

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HENRY D. SHARPE, president, Brown & Sharpe Mfg. Co., Providence, R. I., has become chairman of the foreign commerce department of the United States Chamber of Commerce.

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F. H. RICH, for the past four years assistant treasurer of the Perkins Machine & Gear Co., West Springfield, Mass., has been made general manager of production control and sales. S. F. CUSHMAN, JR., works manager, has been placed in charge of sales promotion and advertising.

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HOWARD EDWARD BOARDMAN, construction engineer of the Boston & Maine Railroad, has been appointed Dudley professor of railroad engineering at Yale University.

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DAVID F. EDWARDS, president, Saco-Lowell Shops, Boston, was the principal speaker at a Biddeford and Saco, Me., Chamber of Commerce dinner last week.

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STANLEY C. HOPE, vice-president of the Gilbert & Barker Mfg. Co., Springfield, Mass., has returned from a seven weeks' business trip in England and France. The company has a plant at Remiremont, France, for the manufacture of gasoline pumps and has tentative plans for production of oil burners there on a large scale.

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A. H. DYCKERHOFF has recently returned from a trip to Germany, where

he was awarded the degree of doctor of engineering, by the University of Berlin. After his graduation from college in Berlin in 1909, Mr. Dyckerhoff spent a year with the Allgemeine Elektrizitaets Gesellschaft in England and several years with the Westinghouse Electric & Mfg. Co. in East Pittsburgh. In 1912 he joined the Illinois Steel Co. and became associated with the Insull companies in 1923.

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CORLISS E. SULLIVAN, chairman of the board of the Central United National Bank, Cleveland, has been elected a director of the Republic Steel Corp., to fill a vacancy on the board. W. W. HANCOCK, secretary, has been elected to serve also as treasurer, succeeding J. U. ANDERSON, who has resigned.

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Industrial Notes

H. B. Small and associates of Sharon, Pa., have purchased the plant of the American Steel Foundry Co. at Sharon, which has been idle since the end of the World War, and plan to develop a new industry. The property consists of 13 acres, four factory buildings, storage capacity for 700,000 gal. fuel oil, and connections with four railroads. Until a year ago, it was kept in readiness for immediate operation. Mr. Small has been general superintendent of the Wheatland Tube Co. at Sharon.

* * *

Globe Stainless Tube Co., Milwaukee, has developed a stainless steel tubing with a highly polished inside surface. These tubes are made in lengths up to 20 ft. and are claimed to be perfectly smooth and bright throughout their entire inside surface. They were specially produced to meet the demands of equipment manufacturers for rustless tubes, free from pits and scratches.

* * *

Ten engineers connected with Arthur G. McKee & Co., Cleveland, sailed recently for Russia, where the McKee company is designing and supervising the construction of a large iron and steel plant for the Soviet Government. This plant will be located at Magnitogorsk in the Ural Mountains.

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Lukenweld, Inc., a division of Lukens Steel Co., Coatesville, Pa., devoted to the design and manufacture of machinery parts by arc welding of rolled steel, has appointed the Dravo Doyle Co. as its representative in the Pittsburgh district, and W. R. McDonough & Co. as representative in the Cleveland territory.

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Laclede Steel Co., St. Louis, has reduced its quarterly dividend, payable June 30, from 50c. to 25c. In a let-

ter to stockholders, the management stated that results for the first half of 1931 reflected ability to meet present conditions successfully, and that a slight upturn in business would place the company on a satisfactory earning basis.

* * *

Consumption of copper for transmission and distribution of current reached a new high record of approximately 260,000,000 lb. in 1930, according to figures presented in a survey of the electric light and power industry completed by the Copper and Brass Research Association. This represents an increase of more than 330 per cent in annual use of copper by power companies since 1920.

* * *

Orders for 327 electric hoists, valued at \$158,355, were placed in May, compared with 314, valued at \$140,500, in April, according to reports received by the Bureau of the Census from 13 leading makers. Shipments were valued at \$135,086 and \$113,164 respectively.

* * *

Shipments of enameled sheet metal ware in April totaled 281,339 doz., valued at \$1,014,103, compared with 312,916 doz., valued at \$1,161,148, in March, according to reports received by the Bureau of the Census from 15 manufacturers, representing approximately 80 per cent of the industry. Shipments in the first four months of the current year aggregated 1,150,692 doz., valued at \$4,205,689, against 1,323,864 doz., valued at \$4,924,555, in the corresponding period of last year.

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Freyr Engineering Co., Chicago, reports the following orders: 10 electric roll heaters and two automatic heat regulating controls for the Beech Bottom works of the Wheeling Steel Corp.; one stockline recorder for Guest, Keen, Baldwins, Ltd., Cardiff, Wales; three pressure burners for the blast furnace plant of Mitsubishi Iron & Steel Co., Japan; two electric roll heaters for the Tokuyama Sheet Steel Co., Tokuyama, Japan; and seven electric roll heaters for various plants in France and Germany.

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An extension of its cost finding system, to include a complete factory budget system, has been made by the Malleable Iron Research Institute, Cleveland, and is being adopted in the plants of several of the institute members.

* * *

The first report of the corrosion committee to the Iron and Steel Industrial Research Council of Great Britain has recently appeared. It is published by the Iron and Steel Institute and the National Federation of Iron and Steel Manufacturers. Its 250 pages contain sections on various phases of the work as well as copious illustrations and a section devoted to the bibliography of copper steels.

▲ ▲ ▲ OBITUARY ▲ ▲ ▲

SAMUEL C. CODDINGTON, founder, former president and more recently chairman of the board, Lakeside Bridge & Steel Co., Milwaukee, died at Mount Sinai Hospital, Milwaukee, on June 13, after an illness of 10 days with pneumonia. He was born in Kansas City in 1881 and established himself in the general engineering business in Milwaukee in 1901. The bridge company, which also manufactures cranes and other heavy shop equipment, was founded in 1911. Mr. Coddington also was president of the Coddington Engineering Co., general contractor, and was interested in numerous other allied industries.

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F. G. KRETSCHMER, who opened the New York office of the Brown & Sharpe Mfg. Co., Providence, R. I., in 1893, following his service with Krupp during the Columbian Exposition, died at Frankfurt am Main, Germany, June 15, aged 70 years. In 1905 he became the representative of several American companies and opened an office in Frankfurt, where he continued to carry on business up to the time of his death.

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FREDERICK C. AUSTIN, retired Chicago manufacturer, died at Pasadena, Cal., on June 11, aged 78 years. Mr. Austin was born at Skaneateles, N. Y. He went to Chicago in 1871 and entered the employ of an uncle, H. W. Austin, pioneer hardware manufacturer. He organized the F. C. Austin Mfg. Co. in 1897 and the Austin Drainage Excavating Co. in 1904. He retired from active business in 1920.

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BARTLETT MURDOCK SHAW, general superintendent of the Walker & Pratt Mfg. Co., Watertown, Mass., maker of stoves, died on June 21 at his home there. Mr. Shaw was a past president of the New England Foundrymen's Association and one of the leading figures in the New England foundry industry. He had been in poor health for more than a year, during which time most of his duties were taken over by his son. Mr. Shaw was born at Carver, Mass., May 1, 1865, and became affiliated with the Watertown concern in 1884 and in 1895 succeeded his uncle, Oliver Shaw, as general superintendent and director.

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The Alloys of Iron Research, which was organized in 1929 by the Engineering Foundation, has issued its first progress report under date of June, 1931. It is a small pamphlet which gives some interesting information on the work already done.

Recovery of Equilibrium Not Far Away

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

FAVORABLE FACTORS

1. Industrial production continues much below normal requirements and appears as low as usual in major depressions.
2. Stocks of manufactured goods have declined more than seasonally for some months; zinc stocks receded in May and price advanced.
3. Many raw material prices are at pre-war levels; signs of greater price stability have appeared; lower production costs will ultimately allow profits and lower prices stimulate demand.
4. Wholesale sales in chief trades increased in April, allowing for usual seasonal variation.
5. Sales of finished steel increased in April, although they usually decline; sales of structural steel made best showing.
6. Building contracts awarded (floor space) held slightly better than usual for season in April and May.
7. Increase in locomotives ordered in May.
8. Industrial and railroad bonds have shown independent strength, warranting hope that confidence may soon return to real investors and thus prepare a basis for industrial expansion.
9. Further liquidation of bank credit; speculative loans reduced to subnormal proportions; deposits large compared with loans and investments; money rates low compared with investment yields.
10. Continued light mercantile inventories.

UNFAVORABLE FACTORS

1. Commodity price indexes continue to decline; raw material prices (including steel scrap) touch new lows; some price reductions still necessary.
2. Production declines, following a temporary rally; stocks of several commodities are still large; unfilled orders low, with the Steel Corporation's figure declining.
3. The P/V line declined again in May, and is below normal.
4. Consumer purchasing power has declined again; factory payrolls and employment off more than seasonally in May; farm income low; further dividend cuts.
5. Retail sales indexes reacted in May.
6. Bank debits lower; postal receipts decline.
7. May building permits fell to a new low and the value of contemplated new construction declined more than seasonally.
8. Automobile production failed to make the predicted gain for May; General Motors' sales to users declined, and dealer inventories increased rather sharply.
9. Machine tool orders declined in May, contrary to the usual seasonal change.
10. Average daily railroad freight tonnage (adjusted) made a new low in May; June car loadings show a continued decline.
11. Foreign trade at new low levels for the recession.
12. Political uncertainties at home and abroad.

WHILE there is yet no definite indication of positive recovery, there is progress in making necessary readjustments. In a negative sense, real improvement is found in corrections of maladjustments in production, credit and prices. A sounder basis is being laid for recovery. Active recovery, however, has not yet begun, nor are the positive forces of recovery yet marshalled. Example—New York money has long been cheap, and lower rates are now evident on customers' loans in other sections; but the feeling of confidence and certainty in the future, necessary to make easy money effective, has not yet been established.

Commodity prices and physical volume of trade have both declined persistently—a condition possible only in major recessions which involve a readjustment in the basis of values. Not only have prices and volume declined, but their ratio, measured by P/V line, has declined also. This is true because prices have fallen much more sharply than volume.

Decline in P/V line indicates that the pressure to sell generally exceeds the will to buy, or that the supply of goods coming to market is greater than can be sold at existing prices. Demand and supply, in the sense of bids and offers, are not in balance. Liquidation is still in progress. But we can go

further than this and can draw these conclusions:

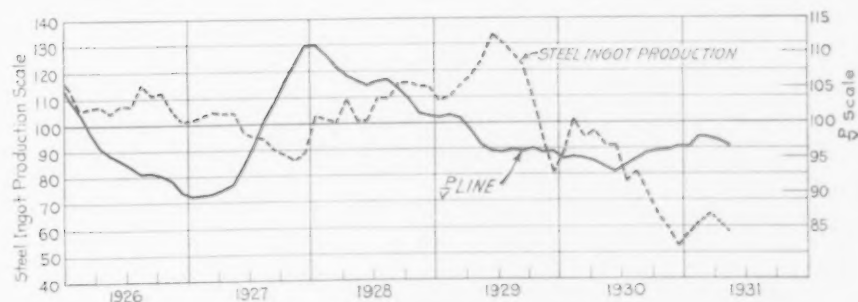
(1) Commodity prices, on the average, are close to or below cost of production. Otherwise there would not be so much curtailment of production.

(2) Probably the supply pressure is now the dominant factor in the situation—the efforts of producers to maintain operations and/or to reduce accumulated stocks.

(3) Prices are probably below the level which would normally equilibrate demand and supply.

We may conclude that the time is not distant when curtailment of production will restore the lost equilibrium. When that time arrives the P/V line will rise and abnormally depressed prices, existing for not a few commodities, are likely to snap back.

It seems highly improbable that the bottom of the cycle in industrial activity will have been touched until the P/V line closely approximates normal. Accordingly, an upturn in business activity is not yet definitely in sight, and probably lies at least two or three months ahead. It is not likely to occur before basic raw materials have made some recovery in price. Precedent, backed by the logic of a close relation between the steel industry and general business, suggests that iron and steel production will suffer some further more-than-seasonal recession.



The Iron Age, June 25, 1931—2075

Dropping of the P/V line and its below-normal level indicate that recovery is still postponed and suggest some further slight curtailment. Better prices should follow.

(ESTABLISHED 1855)

A Rift in the Clouds

A DRAMATIC and unexpected event has accomplished what exhortations of phrase mongers and sage counsel of economists failed to bring about. The well-timed proposal of the President of a moratorium on German reparations and allied debt payments has brought a response in sentiment and an effect on markets which demonstrate that the economic and political condition of Central Europe was far more critical than was commonly realized. Unquestionably pressure against the world's sorest spot has been relieved; the reaction of international opinion has been in proportion to the degree of despondency that prevailed in all business circles.

It is too early to appraise the full effects of President Hoover's move. It would be too much to expect it to usher in an uninterrupted recovery of commodity and security prices. Yet, we may well hope that the effect will parallel that following similar action by President Cleveland, when, late in January, 1895, he took the world unawares by announcing a plan to stop gold exports. The solvency of the United States, then in the depths of depression, was under question. Mr. Cleveland's move worked to restore the credit of the Government forthwith, gave time for applying permanent corrective measures and, as the *New York Times* says, "What was certainly not least important, its psychological effect was to put an end immediately to an atmosphere of hopeless panic." Assuredly, the dark clouds of universal pessimism of 1931 have been broken; despair has been replaced by hope.

A New Stage of the Depression

A CLEVELAND newspaper thus summarizes a recent observation of one of that city's clearest thinking business men, Warren S. Hayden, concerning a line of American production in which output was not excessive in the boom of 1928-29:

Mr. Hayden believes that it is only in depressions that men do any real thinking on economic and social problems. Out of adversity springs man's best thought. When prosperity breaks into depression, men first are resentful, bitter. No good thought comes in that period. As depression continues, they grow reflective. As it continues longer they become wiser. Finally they are able to learn what caused the bad conditions and why things are as they are. But not yet have they learned how to overcome the cause and prevent its recurrence. As soon as prosperity returns, thought on the subject flies out the window.

Of late we have had volume production of cures for our economic distress, and commencements and

conventions have brought a vast outpouring of remedies. Some of these involve overturning the system under which the country advanced to its greatest prosperity, and most of them would be worse than the disease. They are valuable only for any evidence they give of widespread and serious thinking, marking that stage of the depression that precedes the finding of ways and means of recovery. History shows that recovery is not a thing to be staged or programmed. Time is a large factor—time for the maturing of sober second thought, effective anti-toxin for the mob psychology of the "new era" cheer leaders of 1929.

How Long Declining Prices?

COMMODITY prices as a whole have been declining more and more rapidly during the progress of this depression. The Bureau of Labor statistics May index of commodities at wholesale has just been issued, at 71.3, and it is convenient to go back to November, 1929, thus to get 18 months, divisible into three six-month periods. In the three six-month periods the declines have been 5.61 per cent, 9.76 per cent and 11.32 per cent respectively, while the number of points decline has been 5.3, 8.7 and 9.1 respectively. The average monthly declines in the three six-month periods were successively 0.96 per cent, 1.70 per cent and 1.98 per cent.

It will be granted without question that successive drops in dollars and cents cannot continue indefinitely because in time everything would be free. At the rate of the last six months, 9.1 points decrease to 71.3, prices would be down to zero just four years hence. But prices cannot continue declining at the same percentage rate of 1.98 per cent a month. They would lose one-fourth from their present level in less than 15 months. There are some items of cost that cannot be reduced, freight charges being a convenient and just now a conspicuous illustration.

The statistical facts here depicted furnish their own support to the position taken in the last number of THE IRON AGE under the caption "Feeding the Flames of Deflation," where issue was taken with the deflationists who urge that when some things have declined a great deal others must go the same length before stable ground is reached. What we need rather are some anchors.

When things have declined so irregularly and yet the average of all has declined so much, and at an increasing pace, there is clear basis for suspecting that we are going to have some sort of a turn

very shortly. First the dollars and cents rate of decrease would diminish and next the percentage rate of decrease, the average being affected by rebounds in some commodities.

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No Living Is Owed

THERE is a prevalent fallacy that the world owes everybody a living. This finds expression in the demand for a living wage (which is figured higher than the quotient of the national income divided by the number of families); in the complaint of unemployment; and finally in the dogma that the capitalistic system has decayed to tottering.

The essence of communism is indeed that everyone is entitled to a living, but in Soviet Russia what a living! The sociologists who write for some of our magazines and teach in some of our universities ought to go there and see for themselves. Our hard-headed labor leaders will have none of it.

In recent times in this country there has been a migration from the farms to the towns, for the reason that the latter afforded better opportunities and more attractions. The opportunities have lately diminished, only temporarily we hope, but the attractions continue.

Since 1929 there has been some movement from the towns to the farms. Out of the soil it is possible to get food. Our forefathers not only got their food but also their shelter, fuel and clothing. In New England there are many abandoned farms, not always owing to sterility.

We are not promoting this idea as a panacea for the present economic trouble, but the idea of a living being owed leads us into such thoughts. The idea of a living being earned is quite different. If we can all earn good livings we should be thankful. If we have to forego the satisfaction of some of our desires, there is no one to help us. Not even can Moscow do that for its people.

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Seasonal Steel Decreases

STATISTICIANS have a habit of computing average seasonal variations in one thing or another, even venturing not infrequently to call their average the "normal." This may be well enough with some commodities, but it will not do with steel production, which has been as regular in the direction and time of its swings as it has been irregular in their extent. It is the usual—one should avoid use of the term "normal"—thing in steel production to reach a low point in December, a high point in March and a deeper low in July, but the rises and falls have been of various amounts, even in years which in the retrospect appear to have been ordinary years, without disturbing elements.

The recent decrease in steel production appears large, but it is not large relative to the previous increase. There is no evidence that "something fresh has gone wrong," as was said so frequently last year, when production ran up to a high point in February, unprecedentedly early, and then proceeded to fall.

To compare the most recent showing of steel pro-

duction with the past, a comparison is here given of May steel ingot production, with the preceding high months and with the preceding December. It will be seen at once that there have been great variations in the past, while this year has done about as well as any year, comparing May with December, and much better than some. The previous high month was March, except in 1928, when April was high, and 1930, when February was high. Then there was the anomaly of 1929, when May and June were both higher than March.

Steel Ingot Production Relations

	May to Preceding December	May to Preceding High
1924.....	85	60
1925.....	97	82
1926.....	99	91
1927.....	118	93
1928.....	128	90
1929.....	122	101
1930.....	128	88
1931.....	127	84

It would be out of the question to add up the figures for any group of years selected from the above and call the average "normal" or even "usual." Each group would show a different result. And it would be still worse to go further back, into the years when long-range swings were in progress.

One thing is quite clear—that, comparing May with December, no year has done noticeably better than this year, and some years did not do nearly so well. As to the second column, it is true that last month showed a bigger decrease from the preceding high than did any year but 1924 (when a great slump, of a few months' duration, was in progress) and 1925. But the larger decrease this year must be taken as the counterpart of the unusual rise that occurred from December to March. The excess in the rise did not represent a measure of permanent recovery, but simply an unusually wide seasonal swing. That was unexpected, perhaps, but it must now be taken into the reckoning that possibly an off year may bring wide variations instead of a dull monotony.

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Why Not Build?

IN a recent economic address, Hugh Bancroft imagines this picturesque experience:

Let us visualize a village in the farming country where business transactions are sometimes settled by goods instead of money. Two years ago, when the farmers employed the village carpenter they paid him a bushel of wheat for every hour he worked. This winter the farmers sent for the carpenter, but he refused to work unless they paid him two bushels of wheat for each hour. Pressed for his reason, the carpenter replied, "I must protect my American standard of living." As he turned to leave them, he added, "High wages make prosperity"—and then he joined the army of unemployed.

We may proceed with the development as follows:

As John Carpenter disemployed himself he spoiled the sale of some lumber and nails, perhaps some roofing, some galvanized pipe, and other materials. This embarrassed the producers of those

things and they had to discharge some of their men. No longer able to pay any dividends their stockholders were constrained to curtail their buying and reduce their help, so some more persons were added to the unemployed.

Clarence M. Woolley, chairman of the American Radiator & Standard Sanitary Corp., at the last meeting of his stockholders, informed them that residential building is the main source of demand for the products of their company and how this class of construction had begun to decline in November, 1928, with such continuance that in 1930 the larger part of their market was well nigh obliterated.

"The building industry is the largest of the country," continued Mr. Woolley. "Normally it affords employment to over 4,000,000 workmen and contributes 15 per cent of the aggregate tonnage transported by the railroads."

In the opinion of Mr. Woolley the recession in residential building was in large part brought about by the absence of demand for long-term bonds and mortgages, but we may add that such reluctance was a reflection of the burden and risk of the high cost of building.

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What We Can Learn From Europe's Struggle with Unemployment

(Concluded from page 2035)

The history of social legislation in the United States, and specifically that relating to unemployment, points unmistakably to some form of unemployment legislation. The most useful questions are: When, and what kind? If there are those who would resist to the last ditch all legislation whatsoever in this direction, let them recall that such a position generally removes them from the council chambers when the character of the legislation is eventually determined. For those who still believe that such legislation can actually be prevented, time only can render the verdict. Whatever may be one's convictions as to the desirability of unemployment legislation, it is difficult to escape the fact that municipalities and some States have already launched upon programs of unemployment relief from public treasuries. If the business depression extends into another winter, as it will almost certainly do, in any event, for hundreds of thousands of workmen, there can be little doubt that public appropriations will increase. Once the individual donor to charity funds observes that there are larger resources available than his own, he is quite likely to limit his own contributions. In this fashion, social insurance will be extended to unemployment.

The Challenge to Industry

What will industry do with its period of grace? There are but three possible answers to this question:

1. Industry may undertake to eliminate unemployment. None but the incurable optimist can hope for success in this direction except on the part of a relatively few companies which regularize work for the main body of their employees.
2. Industry may let nature take its course. The

outcome of this is almost certainly compulsory unemployment insurance administered through the public treasuries by political appointees.

3. Industry may set up systems for unemployment reserves in companies, in communities or on an industrial basis. Such action not only has in it great possibilities for the stabilization of employment for thousands of workers, but would probably determine or greatly influence the character of unemployment legislation when adopted.

This is not the day blindly to close our eyes to the actualities about us. A mere denial of the existence of undesirable conditions does not blot them out. Whether or not we like the bed we are lying in, it seems to have the following contours which may serve as a summary to this article:

1. Unemployment crises are long established recurrences in industry. There is no reason to expect that they will not continue in the future. Preventive measures may reduce, but cannot be expected to eliminate unemployment.

2. Political and social discontent follows on the heels of unemployment.

3. Labor and social legislation has been steadily increasing in the United States as in other countries, particularly during the past 30 to 40 years.

4. Organized labor and organized employers are on common ground in their opposition to political solutions for industrial problems.

5. However, State control of industrial relations is becoming more extensive in the United States through evolutionary changes, as contrasted with the more radical political controls of Europe.

6. A nation-wide system of public employment offices is in process of formation in the United States. As accompaniments of this system there will probably be regular and systematic statistics, and the transference of workers from one center to another according to need, an extension of vocational guidance in the schools, and plans for the retraining of experienced workers.

7. The cost of unemployment relief and the cost of maintaining a reserve supply of labor in the last analysis falls upon industry either through indirect labor cost or through taxes.

8. The assessment of costs as nearly as possible according to company or industrial groups gives credit to those industries which have a low rate of unemployment and encourages prevention.

9. The primary responsibility rests upon industry to create conditions which will make unnecessary public action. We no longer "defend the right of man to starve to death if he wants to."

10. A laissez faire policy on the part of industry with regard to working conditions and industrial relations has always been followed by political action. The legislator will undertake to do that which industry fails to do.

11. With respect to unemployment reserves, industry will probably be given another chance before unemployment insurance legislation is passed.

12. Unless industry generally undertakes to set up effective voluntary plans for unemployment relief, legislative plans, probably of a compulsory nature, will follow.

13. Employers yet have the opportunity to build up industrial systems of unemployment reserves. To the extent that these are successful, public action will become unnecessary or legislation when adopted will follow an industrial pattern.



Trio of Market Factors Condition Course of Steel Business

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PROPOSED Moratorium on
War Debts, Coal Strike and
Possible Freight Rate Advance
May Change Trend—Pittsburgh
Scrap at Low Point of Century
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THE President's moratorium program, the coal strike and the application of the railroads for a rate advance loom up as factors which, singly or in combination, may pull the iron and steel market out of the doldrums.

Overshadowing the others is the dramatic and unexpected move for a holiday in reparations and war debts, which brought such a prompt and universal upturn in securities and among such commodities as cotton, wheat and the non-ferrous metals.

The coal strike, at first without noticeable effect on fuel markets, is spreading, materially reducing mine output in western Pennsylvania and West Virginia and making an advance in coke and coal prices an early possibility.

The plea of the carriers for higher rates, although not unopposed, has been sympathetically received by an unusually large proportion of industrial shippers, suggesting that part, if not all, of the 15 per cent advance asked for will be granted. An increase of 10 per cent, it is estimated, would raise steel-making costs \$1 a ton, an increment which would doubtless stiffen mill prices and sharply stimulate shipments prior to the effective date of the new rates.

TO what extent any of these factors will actually influence the course of the iron and steel market is still uncertain, but the very fact that imponderables have been introduced in an otherwise depressing situation has quickened the interest of the trade. While buyers have not abandoned their spirit of caution to the extent of placing orders more freely, inquiries are somewhat more numerous. Unquestionably consumers will closely watch the course of events in the next week or two for a cue as to their next move.

So far as seasonal trend is concerned there is nothing to suggest haste in buying. Steel output has lost further ground at Pittsburgh, Cleveland, Youngstown and Chicago, although increasing slightly at Buffalo, and ingot production for the country at large now averages 36 per cent, as compared with 38 per cent a week ago. Additional recessions seem inevitable unless sentiment, which now appears to be veering, actually undergoes a marked change.

ONE barometer that will command more than usual attention under current conditions is the scrap market. During the past week heavy melting steel

has declined 25c. a ton at Pittsburgh and Detroit and \$1 a ton at Philadelphia. The purchase of a sizable tonnage of heavy melting grade at Pittsburgh at \$10, delivered, brought the market in that district to as low a level as has been reached in the present century, that price having been touched only once before, in December, 1914. THE IRON AGE composite price for heavy steel scrap has declined from \$9.50 to \$9.08 a ton, which is only 8c. a ton higher than the 30-year low reached on Nov. 18, 1914.

FINISHED steel prices are still without definite trend, with their future course hanging in the balance. While most sheet mills have adopted the new classification prices for third quarter, spot sales in the past week have brought out fresh concessions in galvanized, black and No. 10 continuous mill sheets. Bolt and nut makers have given an additional 10 per cent discount to large buyers.

THE placing of outstanding tonnages of line pipe and structural steel and a modest pickup in railroad buying have given color to an otherwise drab picture, so far as current demand is concerned. Two orders for line pipe account for a total of 58,000 tons. Fabricated steel awards aggregate 34,000 tons, including 20,000 tons for a railroad bridge over the Ohio River. Bids have been opened on 110,000 tons of steel for the Golden Gate bridge, San Francisco. New fabricated work that has come up for figures during the week totals 44,000 tons. Fresh inquiries for reinforcing bars, at 11,600 tons, are the largest since the last week in March.

Action on the large amount of pending pipe line and construction projects may be expedited if market sentiment shows a further change for the better. The Lycoming Natural Gas Co. is expected to place a contract shortly for 25,000 tons for a line from northern Pennsylvania to southern New York. The Peoples Gas Co., Pittsburgh, has entered the market for 22,000 tons. American mills are counting on participating in orders for an Irak oil line, which will take a total of 175,000 tons.

The Pennsylvania has placed 90 locomotives and will shortly award 2800 tons of steel for electrification of its Wilmington-Washington line. The Northwestern Refrigerator Line has bought 200 cars and the Fruit Growers Express has closed for 800 underframes.

PITTSBURGH

Ingot Output for District Close to 35 Per Cent Rate

PITTSBURGH, June 23.—Despite the placing of several outstanding tonnages of steel in the form of pipe and structural shapes during the last week, general market tendencies which have been in evidence since the first of the month have not been interrupted. The general run of releases continues very light, and production of steel ingots has declined further in the Pittsburgh district.

No open-hearth furnaces are running this week at the plant of one of the smaller independent companies, while others with batteries of 10 to 12 furnaces are operating two or three units weekly. The leading independent and the Steel Corporation subsidiaries are running at about 40 per cent, with an average for the district as a whole of only slightly more than 35 per cent. Production is unchanged in the Wheeling district, while raw steel output in the Valleys has declined despite the increases at one point occasioned by a large pipe order.

The Pittsburgh district will benefit materially from an order for 17,000 tons of pipe placed during the week by an oil company. A local fabricator has also taken 20,000 tons of structural shapes for a railroad bridge over the Ohio River at Henderson, Ky. These orders are much more important to the current situation than the total tonnage would indicate, as they will benefit mills immediately, while some larger tonnages of structural shapes which were placed earlier in the year will not affect operations before fall.

As the present rate of specifications is fully sufficient to sustain current raw steel output, any further decline in production would seem to indicate that steel producers were anxious to reach a minimum rate in order to provide a better foundation for seasonal improvement in the fall.

Releases of automobile steel for July shipment have been better than anticipated by some mills. Reports of complete suspension during July by one large maker of low-priced cars are still heard, but one mill serving that company has releases for shipment up until the middle of the month. Other automobile companies have reduced their requirements only moderately. Current sheet and strip mill schedules have been allowed to fall so low that sudden increases during a week are not uncommon.

Makers of sheets are actively soliciting tonnage for shipment during July at current prices. This has resulted in some shading of present low quotations, which is expected to disappear after July 1. Makers of hot-rolled strip have taken some tonnage

Steel production decline unchecked, ingot output for district now being close to 35 per cent rate.

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Large orders for pipe and structural shapes aid mills in Pittsburgh and Youngstown.

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Releases of automobile steel for July better than anticipated by some mills.

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Active solicitation of sheet tonnage for July rolling results in price shading, notwithstanding higher quotations announced for third quarter.

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Sale of heavy melting scrap at \$10 brings price down to lowest level in present century.

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at prices \$1 over the current market, but not enough business has been closed to establish the higher figures definitely. On the remainder of finished steel products, no efforts are being made to change existing quotations, and contracts are being renewed when consumers ask for extensions at the same prices paid during the current quarter.

Purchase of a tonnage of No. 1 heavy melting steel at \$10, delivered, has brought the scrap market to the minimum figures of the last 30 years, which was reached at the end of 1914. In the meantime, sentiment has improved and the market is comparatively strong. Pig iron is very quiet, but the local market is beginning to reflect the lower production occasioned by the coal strike, and coal is becoming increasingly difficult to buy. Prices have not been materially affected.

PIG IRON

Shipments this month are falling slightly under those of May, and there is little new buying. No third quarter inquiry has appeared in this district. The larger consumers are said to be covered for some time in advance. At least one large foundry in the district has increased its melt of scrap at the expense of pig iron in the last few months. Producers in the Valley are still quoting \$17 on Bessemer, malleable and foundry iron, while the local maker is asking 50c. a ton more. Basic iron is nominal at \$15.50 to \$17, Valley, and the real market at Pittsburgh is probably even

lower because of steel company competition.

Prices per gross ton, f.o.b. Valley furnace:

Basic	\$15.50 to \$16.00
Bessemer	17.00
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.00
Low phos., copper free....	26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	\$16.00 to \$16.50
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Bessemer	17.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

SEMI-FINISHED STEEL

No activity is reported in this market. Billets, slabs and sheet bars are still nominally quotable at \$29 to \$30, Pittsburgh or Youngstown. A few consumers of forging billets have entered third quarter contracts at \$35, Pittsburgh. The same is true of wire rods, although users are apathetic and makers are not actively seeking tonnage.

RAILS AND TRACK SUPPLIES

Shipments this month are running considerably below those of May, which is in line with seasonal expectations; the decline has been no greater than usual. A few track accessory inquiries for third quarter are before the trade, but buying is expected to be light. Accessory activity is engaged at a somewhat lessened rate, while the local rail mill is operating on unchanged schedules.

BOLTS, NUTS AND RIVETS

Makers have been soliciting third quarter business at unchanged prices, and some forward tonnage has been booked. Current releases are very light. The industry in this district is not running at more than 25 per cent of capacity. Bolts and nuts are quoted at 73 per cent off list, small rivets at 70, 10 and 5 per cent off list, and large rivets at \$2.75 a 100 lb., Pittsburgh.

BARS, PLATES AND SHAPES

The American Bridge Co. has received an order for 20,000 tons of structural material for a railroad bridge at Henderson, Ky. Work on the project is expected to be begun in the very near future. Another railroad bridge, requiring 900 tons, has been placed, but with the exception of these larger jobs the market is rather quiet. Fabricators are still waiting for plans to be released for the South Tenth Street bridge at Pittsburgh, which will take 5000 tons. Bids were

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	June 23, 1931	June 16, 1931	May 26, 1931	June 24, 1930
No. 2 fdy., Philadelphia.....	\$17.26	\$17.26	\$17.26	\$19.76
No. 2, Valley furnace.....	17.00	17.00	17.00	18.50
No. 2 Southern, Cin'ti.....	14.69	14.69	14.69	16.69
No. 2, Birmingham.....	12.00	12.00	12.00	14.00
No. 2 foundry, Chicago*.....	17.50	17.50	17.50	18.00
Basic, del'd eastern Pa.....	17.00	17.00	17.00	18.75
Valley Bessemer, del'd P'gh.....	15.50	15.50	15.50	18.50
Malleable, Chicago*.....	18.76	18.76	18.76	20.76
Malleable, Valley.....	17.50	17.50	17.50	18.00
L. S. charcoal, Chicago.....	17.00	17.00	17.00	19.00
Ferromanganese, seab'd car lots.....	25.04	25.04	25.04	27.04

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Ferromanganese quotations adjusted to carload unit; larger quantities sold at discounts.

Rails, Billets, etc., Per Gross Ton:	June 23, 1931	June 16, 1931	May 26, 1931	June 24, 1930
Rails, heavy, at mill.....	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill.....	34.00	34.00	34.00	36.00
Rerolling billets, Pittsburgh.....	29.00	29.00	29.00	31.00
Sheet bars, Pittsburgh.....	29.00	29.00	29.00	31.00
Slabs, Pittsburgh.....	29.00	29.00	29.00	31.00
Forging billets, Pittsburgh.....	35.00	35.00	35.00	36.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	36.00
Skelp, grvd. steel, P'gh, lb.....	1.65	1.65	1.65	1.70

Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.65	1.65	1.65	1.65
Bars, Chicago.....	1.70	1.70	1.70	1.75
Bars, Cleveland.....	1.65	1.65	1.65	1.75
Bars, New York.....	1.98	1.98	1.98	1.98
Tank plates, Pittsburgh.....	1.65	1.65	1.65	1.65
Tank plates, Chicago.....	1.70	1.70	1.70	1.75
Tank plates, New York.....	1.93	1.93	1.93	1.93
Structural shapes, Pittsburgh.....	1.65	1.65	1.65	1.65
Structural shapes, Chicago.....	1.70	1.70	1.70	1.75
Structural shapes, New York.....	1.90 1/2	1.90 1/2	1.90 1/2	1.90 1/2
Cold-finished bars, Pittsburgh.....	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh.....	1.55	1.55	1.55	1.65
Cold-rolled strips, Pittsburgh.....	2.15	2.15	2.15	2.45

Finished Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.....	2.15	2.15	2.15	2.55
Sheets, black, No. 24, Chicago.....	2.35	2.35	2.35	2.65
dist. mill.....	2.70	2.75	2.80	3.15
Sheets, galv., No. 24, P'gh.....	2.85	2.85	2.90	3.25
dist. mill.....	2.00	2.00	2.00	2.15
Sheets, blue, No. 13, P'gh.....	2.10	2.10	2.10	2.25
dist. mill.....	1.80	1.80	1.80	2.05
Wire nails, Pittsburgh.....	1.85	1.85	1.95	2.15
Wire nails, Chicago dist. mill.....	2.20	2.20	2.20	2.30
Plain wire, Pittsburgh.....	2.25	2.25	2.25	2.35
Barbed wire, galv., P'gh.....	2.55	2.55	2.55	2.80
Barbed wire, galv., Chicago.....	2.60	2.60	2.60	2.85
dist. mill.....	\$5.00	\$5.00	\$5.00	\$5.25

Old Material, Per Gross Ton:

Heavy melting steel, P'gh.....	\$10.00	\$10.25	\$11.00	\$15.00
Heavy melting steel, Phila.....	8.50	9.50	9.50	12.50
Heavy melting steel, Ch'go.....	8.75	8.75	8.75	12.00
Carwheels, Chicago.....	10.00	10.00	9.50	13.50
Carwheels, Philadelphia.....	12.00	12.00	12.00	14.50
No. 1 cast, Pittsburgh.....	10.25	10.25	11.00	14.25
No. 1 cast, Philadelphia.....	11.50	11.50	11.50	13.00
No. 1 cast, Ch'go (net ton).....	9.00	9.00	9.00	12.00
No. 1 RR. wrot., Phila.....	10.00	10.00	11.00	15.00
No. 1 RR. wrot., Ch'go (net).....	7.00	7.00	7.50	10.00

Coke, Connellsville,

Per Net Ton at Oven:	Cents	Cents	Cents	Cents
Furnace coke, prompt.....	\$2.40	\$2.40	\$2.40	\$2.50
Foundry coke, prompt.....	3.50	3.50	3.50	3.50

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York.....	8.37 1/2	8.37 1/2	9.12 1/2	12.12 1/2
Electrolytic copper, refinery.....	8.00	7.75	8.50	11.75
Tin (Strait), New York.....	23.95	22.75	22.75	30.75
Zinc, East St. Louis.....	3.50	3.40	3.30	4.37 1/2
Zinc, New York.....	3.85	3.75	3.65	4.67 1/2
Lead, St. Louis.....	3.97 1/2	3.60	3.60	5.15
Lead, New York.....	4.15	3.75	3.75	5.25
Antimony (Asiatic), N. Y.....	6.25	6.05	6.40	7.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

taken on June 22 on the Louisville, Ky., Post Office, requiring 2400 tons. Demand for reinforcing bars seems to be quieter than it was earlier in the month, although shipments on old projects are continuing at a good rate. No barge business is reported placed, but inquiry is still fairly active. Shipments of the heavy hot-rolled products generally are running about 10 per cent under those of May, but are considered fairly good when compared with other finished steel products. A large portion of the decline is accounted for by the automobile industry, which is taking less of both alloy steel and plain carbon bars.

With no definite announcement regarding third quarter prices, mills are renewing contracts at the figures prevailing in the present quarter. Small consumers are paying 1.65c., Pittsburgh, on this business, but little effort is being made to advance the contract price of those whose business was taken at a lower level.

COLD FINISHED STEEL BARS

Consumers are in no hurry to place their third quarter business, and mills are not active in solicitation. With

no change in price, some existing contracts will likely be extended into the next quarter.

TUBULAR GOODS

The Shell Union Oil Corp'n. has placed an order for approximately 17,000 tons of 10 1/2-in. seamless pipe with a Pittsburgh district maker. The pipe will be laid from the east Texas fields, and is the third sizable order taken by that maker for shipment to that territory. The Shamrock Oil & Gas Co. is also contemplating a line from the east Texas fields to Houston for use by independent operators in the east Texas area. Although still in the tentative stage, this line would take approximately 225 miles of pipe, and may come to a Pittsburgh district maker. The line of the Lycoming Natural Gas Co., extending from the northern Pennsylvania fields to points in New York State, is expected to be let in the near future. About 25,000 tons of steel will be required. A Youngstown maker has taken an order for 41,000 tons of 26-in. electrically welded pipe. Lapweld material is still dull, while demand for standard pipe continues steady at reduced

levels. Mechanical tubing and boiler tubes are slightly more active.

WIRE PRODUCTS

Mills in this district have not booked very much third quarter tonnage, although prices are now generally understood to be continued at \$1.80 a keg on nails, and 2.20c., Pittsburgh, for manufacturers' wire. Merchant products are particularly dull, but increased activity is expected in the agricultural regions after crops are harvested.

SHEETS

With scarcely a week left in which to place tonnage for July delivery at present prices, several companies are soliciting tonnage rather vigorously, and prices have been shaded considerably on some of this business. Quotations in the South and Southwest are also exceptionally low if figured on a delivered basis for all-rail shipment. However, much of this material is moving to warehouses by water. The new prices on sheets to become effective for shipment after June 30 have not been given much test, although some producers report

THE IRON AGE COMPOSITE PRICES

Finished Steel		Pig Iron	Steel Scrap
June 23, 1931	2.102c. a Lb.	\$15.63 a Gross Ton	\$9.08 a Gross Ton
One week ago	2.102c.	15.63	9.50
One month ago	2.114c.	15.63	9.75
One year ago	2.185c.	17.42	13.17
Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.		Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	
Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.			
High		High	Low
1931	2.142c., Jan. 13	15.90, Jan. 6	\$11.33, Jan. 6
1930	2.362c., Jan. 7	18.21, Jan. 7	15.90, Feb. 18
1929	2.412c., April 2	18.71, May 14	17.58, Jan. 29
1928	2.391c., Dec. 11	18.59, Nov. 27	16.50, Dec. 31
1927	2.453c., Jan. 4	19.71, Jan. 4	15.25, Jan. 11
1926	2.453c., Jan. 5	21.54, Jan. 5	17.25, Jan. 5
1925	2.569c., Jan. 6	22.50, Jan. 13	20.83, Jan. 13
	Low	Low	Low
	2.102c., June 2	\$15.63, May 26	\$9.08, June 23
	2.121c., Dec. 9	15.90, Dec. 16	11.25, Dec. 9
	2.362c., Oct. 29	18.21, Dec. 17	14.08, Dec. 3
	2.314c., Jan. 3	17.04, July 24	13.08, July 2
	2.293c., Oct. 25	17.54, Nov. 1	13.08, Nov. 22
	2.403c., May 18	19.46, July 13	14.00, June 1
	2.396c., Aug. 18	18.96, July 7	15.08, May 5

a few orders at the higher levels. On spot business, prices range from 2.15c. to 2.25c. on black sheets, 2.75c. to 2.80c. on galvanized, 2c. on blue annealed and 1.85c. on light plates. While concessions from these levels are not common in the Pittsburgh territory, lower figures have been made in some districts.

Demand for sheets continues very quiet, but tonnage is now better distributed among the other consuming industries. Demand from the automobile makers continues to decline. Operations fluctuate sharply from week to week, but are estimated at about 35 per cent of capacity in the aggregate.

TIN PLATE

Mill schedules have been revised somewhat by some makers, but still stand at about 65 per cent of capacity. Improvement is expected as vegetable crops reach maturity in the next month or two, and container manufacturers are more rushed for tonnage. The price continues at \$5 a base box, Pittsburgh.

STRIP STEEL

Releases have held up fairly well in the last week, but still represent scarcely 25 per cent of the industry's capacity. Automobile demand is lagging particularly, but general consumption is very low, with consumers ordering in exceptionally small lots. Production averages from 25 to 30 per cent of capacity.

While some current tonnage for immediate shipment is being booked at 1.50c. and 1.60c., Pittsburgh, for hot-rolled material, contract business is generally bringing \$1 a ton more, and mills seem to be determined to hold to the higher figures. Cold-rolled strip is still quotable at 2.15c., and price shading is confined to tonnage for immediate shipment.

COAL AND COKE

Strikes in this territory are beginning to be felt in the market for coal and coke, as production has declined considerably, and a number of operators are unable to fill orders as scheduled. A majority of the mines on the Panhandle division of the Penn-

sylvania Railroad are not operating, and this is also true on the Pittsburgh & West Virginia. A number of Monongahela River mines are also down, and the strike continues to spread. The properties of two large steel companies in the district are affected, and some of the railroads have been forced to ask for heavier shipments from companies whose quotas have been maintained. Despite shrinking production, no actual price advances have been undertaken on either coal or coke. The foundry grade of coke is still quoted at \$3.25 to \$3.50, and the furnace grade at \$2.40, Connellsville. Some action on price is expected within the next week if the spread of labor troubles is not checked.

OLD MATERIAL

Purchase of a fair-sized tonnage of No. 1 heavy melting steel by a Pitts-

Warehouse Prices, f.o.b. Pittsburgh

*Base per Lb.

Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	2.95c.
Hoops	3.95c.
Black sheets (No. 24), 25 or more bundles	3.05c.
Galv. sheets (No. 24), 25 or more bundles	3.40c.
Light plates, blue annealed (No. 10)	2.75c. to 3.00c.
Blue annealed sheets (No. 13)	2.90c. to 3.00c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.74c.
Spikes, large	2.65c.
Small	2.90c. to 3.05c.
Boat	3.15c.
Track bolts, all sizes, per 100 count, 60 and 10 per cent off list	
Machine bolts, 100 count, 60 and 10 per cent off list	
Carriage bolts, 100 count, 60 and 10 per cent off list	
Nuts, all styles, 100 count, 60 and 10 per cent off list	
Large rivets, base per 100 lb.	\$3.20
Wire, black, soft ann'd, base per 100 lb.	2.30
Wire, galv. soft, base per 100 lb.	2.75
Common wire nails, per keg	2.05
Cement coated nails, per keg	2.05

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

burgh district consumer at \$10, delivered, has established the scrap market at as low a level as has been reached in the present century. Only once, in December, 1914, was heavy melting steel bought in the Pittsburgh district at this price. This week's buyer of heavy melting steel also purchased rails and hydraulic compressed sheets at \$9.50, although the latter commodity can hardly be bought by dealers at this figure. Steel, however, is rather freely available at \$9.75, and some tonnage has been bought by dealers at as low as \$9.50. No other mill purchases are reported, but sentiment in the market is distinctly improved in the last day or two, with the result that dealers are more anxious than ever to accumulate scrap for their yards and are showing less disposition to push sales into consumption. Mills do not seem any more disposed to build up their stocks than heretofore, and actual consumption of scrap is still declining as open-hearth operations are reduced.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

No. 1 heavy melting steel	\$9.75 to \$10.25
No. 2 heavy melting steel	9.25 to 9.75
Scrap rails	9.25 to 9.75
Compressed sheet steel	9.25 to 9.75
Bundled sheets, sides and ends	8.00 to 8.50
Cast iron car wheels	10.50 to 11.00
Sheet bar crops, ordinary	11.00 to 11.50
Heavy breakable cast	8.00 to 8.50
No. 2 railroad wrought	9.75 to 10.25
Hvy. steel axle turnings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00

Acid Open-Hearth Grades:

Railr. knuckles and couplers	12.50 to 13.00
Railr. coil and leaf springs	12.50 to 13.00
Roller steel wheels	12.50 to 13.00
Low phos. billet and bloom ends	14.00 to 15.00
Low phos. mill plates	12.00 to 12.50
Low phos. light grades	12.00 to 12.50
Low phos. sheet bar crops	13.00 to 13.50
Heavy steel axle turnings	9.00 to 9.50

Electric Furnace Grades:

Low phos. punchings	13.50 to 14.00
Heavy steel axle turnings	9.00 to 9.50

Blast Furnace Grades:

Short shoveling steel turnings	6.75 to 7.25
Short mixed borings and turnings	6.75 to 7.25
Cast iron borings	6.75 to 7.25

Rolling Mill Grades:

Steel car axles	16.50 to 17.50
Cupola Grades:	
No. 1 cast	10.00 to 10.50
Rails 3 ft. and under	12.50 to 13.00

CHICAGO

Steel Ingot Output Continues to Drift Slightly Lower

CHICAGO, June 23.—The drift of steel ingot production to lower levels is unchecked. The average now is not above 38 per cent of capacity, a slight loss as compared with a week ago. A blast furnace has been banked at South Chicago. The leading producer now has three furnaces lighted at Gary, two at South Works and one at Joliet. The count of active steel mill stacks in the district now stands at 11 of 36.

In the sales departments of steel companies there is a distinct feeling of disappointment, not solely because of the curtailment in the immediate needs of consumers, but chiefly because of the small amount of interest in commitments for the third quarter.

The Midwestern structural steel market has turned quiet after having set a rather rapid pace in the early weeks of June. On the other hand, encouragement is to be found in the railroad equipment market. Under-frame inquiries and awards are of fair size, and steel producers expect, as has occurred in the past, that business of this character will later bring into the market additional tonnage for superstructure sets. It is noteworthy that Chicago mills are already more heavily engaged in producing car material. It is quite likely that more steel will soon be moving to certain Western railroad shops, as workers are being called back to their jobs.

Demand for barbed wire is rapidly gaining headway, and shipments are heavier than in the first five and one-half months of 1930. On the other hand, miscellaneous construction is falling back, and consumption of nails is not only seasonally small, but below the average in May.

Price structures remain unaltered, with the exception that most sheet manufacturers have now fallen in line with the new schedule, which becomes effective on July 1.

PIG IRON

This market is quiet in the absence of a noteworthy volume of transactions for the third quarter. Here and there a consumer has entered an inquiry for future iron, and a few contracts have been closed. In the meantime, shipments continue to taper at a rate that is about normal for this time of year. Output is limited to three merchant stacks that are not being operated at capacity. Prices for Northern foundry iron are steady at \$17.50 a ton, local furnaces. Quotations on Southern iron are \$11 a ton, Birmingham, but consumer interest is low and recent transactions cover only a few scattered car lots. The tone of the charcoal market is somewhat firmer, due probably to the

Steel ingot production continues to decline moderately, now averaging 38 per cent for district.

* * *

Consumers are little interested in third quarter commitments, a factor that is discouraging to steel companies.

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Sheet producers in Chicago district have adopted new classification and prices for third quarter.

* * *

Railroad equipment orders are better, as compared with recent months.

* * *

Scrap still fails to develop a definite trend, with prices weak and uncertain.

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fact that production has been cut to the output of only one stack. There have been no large orders for silvery that would offer tests of prices. However, miscellaneous inquiries and purchases are more numerous by melters who make use of this commodity for mixtures in which they are taking advantage of low prices for scrap.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	\$25.04 to 27.04
S'th'n No. 2 fdy.	17.01
Low phos., sil. 1 to 2, cop-per free	28.50 to 29.20
Silvery, sil. 8 per cent	24.79 to 26.79
Bess. ferrosilicon, 14-15 per cent	35.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including an average switching charge of 61c. per gross ton.

PLATES

Of special note is the continued improvement in the railroad equipment market. The change is not radical, but it is important for the reason that this market has been extremely dull throughout the year. The Northwestern Refrigerator Line Co. has ordered 200 cars and the Fruit Growers Express has placed 800 underframes. There seems to be some uncertainty about the report that the Pacific Fruit Express will buy underframes, but it is quite certain that the Northern Pacific will soon ask for 500 underframes for cars that are to be built in its own shops. Recent orders placed by this railroad have been closely followed by contracts for

superstructure sets, thereby adding materially to the steel tonnage required. It is reported, but unconfirmed, that a Western car shop has taken an order for 500 box cars. Railroad business placed in the last few weeks accounts for an upward turn in car material moving from local steel mills, and the more recent orders point the way for a still heavier movement.

An oil producer at Oklahoma City is in the market for 3000 tons of steel for storage tanks. However, this inquiry is not attracting as much attention as might be expected at a time like this for the reason that there are complications in the financial arrangements, and steel producers are not inclined to ship steel and take oil in storage as payment. This set-up is not peculiar to the Oklahoma City job, for there are other attractive tonnages that could be had under similar arrangements. There is a lull in large-diameter pipe inquiries and awards. A Youngstown mill is said to have taken an order for 41,000 tons of pipe. Nearby pipe producers are confining their work to old business, for which there is rather a steady flow of skelp, one plate mill in this district being engaged almost at capacity on work of this kind.

Prices for plates remain steady at 1.70c. a lb. for the bulk of tonnage that is moving, and it seems to be more or less generally understood that this quotation will carry into the next quarter.

STRUCTURAL MATERIAL

Aside from an award of 20,000 tons for a railroad bridge at Henderson, Ky., the structural market is very quiet. This situation has not been unexpected, as inquiries have been falling off, and fabricators have realized that lack of estimating was heading the market toward a dull period. It is reported that the electrical group of buildings for the World's Fair has again been postponed, and no encouraging news is to be had concerning the plans for the Chicago Post Office. At Milwaukee, a proposition has been submitted by local fabricators whereby the 7000-ton viaduct contemplated for that city will be divided among them. The argument put forth deals largely with relief of local unemployment. Bids have been opened on a round tonnage of steel for use in Illinois highway bridges.

BAR

Western bar mills continue to hold the lead over other finishing mills. The rate of production ranges from 40 to 45 per cent of capacity, whereas ingot output is not above 38 per cent. Use of bars by the automobile industry so far in June has not fallen

far behind the May rate, though new specifications are smaller in the aggregate and local mills foresee rather sharp curtailment in July. Nash, which is about ready to announce new models, is holding to a substantial rate of output. There is a tapering in new specifications from miscellaneous manufacturers, who are planning shutdowns in July. Some of these vacation periods will be for two weeks, while others are now planned to take in the entire month. Alloy bar mills continue to produce at 40 per cent of capacity, but consumption is waning and there is virtually no interest in third quarter requirements.

The iron bar market remains dull. Within recent days several Western railroads have started to call back shop workers, but it is too early for heavier railroad shop operations to be reflected in demand for iron bars. Specifications for rail steel bars are turning up moderately. New buying also shows improvement over that at the middle of the month, but purchases are almost without exception for immediate delivery. Output ranges from 50 to 55 per cent of capacity.

WIRE PRODUCTS

The past few days have been among the quietest of the year. Crops are being harvested in southern Illinois, and the grain movement is well under way in the Southwest. These conditions point to increased buying power in those agricultural districts. Use of nails from Chicago westward is very light, but there is a fairly satisfactory demand for barbed wire and concrete reinforcement mesh. Consumption of copper wire by public utilities remains spotty and small, but reports are persistent that the number of plans for future development is steadily increasing. Interest in third quarter contracting is lacking, but producers of wire and wire products, in analyzing the outlook in farming communities, foresee an upward turn in trade by mid-August.

RAILS AND TRACK SUPPLIES

New orders for standard-section rails total only about 1000 tons, but releases this week, at 6000 tons, are rather satisfying to producers. Specifications for track supplies are off sharply. Mill books are still carrying fair tonnages, but sellers are having difficulty in getting the railroads to issue releases.

CAST IRON PIPE

The cast iron pipe market has changed little in recent days. Akron, Ohio, is reported to have placed 200 tons with American Cast Iron Pipe Co. The United States Pipe & Foundry Co. has been awarded 3000 ft. of 3 and 24-in. pipe by Madison, Wis. The trade is looking forward to inquiries for more than 2000 tons of pipe and specials that will be needed by the Sanitary District in the Calumet area near Chicago. A Cincinnati contractor has been successful at Tippe-

canoe City, Ohio, where 16,000 ft. of 4 to 8-in. pipe is needed.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$42 to \$44; 4-in., \$45 to \$47; Class A and gas pipe, \$3 extra.

SHEETS

Inland Steel Co. has been added to the number of sheet producers that have adopted the new sheet schedule, which becomes effective on all orders taken on and after July 1. In the mean time, old quotations hold, but consumers seem to be giving little thought to covering for future needs before the advance takes effect. Production still averages about 40 per cent of capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.40c. to 2.50c.; No. 24 galv., 2.95c. to 3.05c.; No. 10 blue ann'd, 2.00c. to 2.10c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

BOLTS, NUTS AND RIVETS

Consumption of these commodities continues to grow lighter. Forward contracting is near the end, and the third quarter will start with only a comparatively small part of second quarter contracts having been taken out.

REINFORCING BARS

Quotations on rail steel bars used for pavement, culverts and bridges have been reduced \$2 to \$3 a ton. Bars for concrete road slabs are now quotable at 1.50c. a lb., Chicago warehouse, and 1.65c. is the price for bridges and culverts. Movement of reinforcing bars to road contractors is holding at a good rate, and the tonnage on mill books will be augmented by 2600 tons needed for Illinois State contracts that have been let within the last few days. From the viewpoint of building this is one of the quietest summers in many years. Bending shop operations do not range above 35 to 40 per cent of capacity. Shop backlogs are growing lighter, and estimators are finding little to do.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel, 1.65c. to 2.00c.	
Rail steel reinforcement—	
For buildings	1.45c. to 1.65c.
Highway slabs	1.50c.
For bridges and culverts.....	1.65c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.10c.
Flats and squares	3.60c.
Bands, $\frac{3}{4}$ in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter) ..	3.50c.
Black sheets (No. 24).....	3.55c.
Galv. sheets (No. 24).....	4.10c.
Blue ann'd sheets (No. 10).....	3.20c.
Spikes ($\frac{3}{4}$ in. and larger).....	3.45c.
Track bolts	4.30c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach and lag screws.....	60 and 10
Hot-pressed nuts, sq., tap. or blank, 60 and 10	
Hot-pressed nuts, hex., tap. or blank, 60 and 10	
No. 8 black ann'd wire, per 100 lb. \$3.45	
Com. wire nails, base per keg.....	2.30
Cement c'd nails, base per keg.....	2.30

COKE

Both producers and consumers are watching this market rather closely to determine, if possible, the effects to be expected from strikes in coal fields and the railroads' request for advances in freight rates.

OLD MATERIAL

Shipment of heavy melting steel to Chicago mills has been cut from 15 to 20 per cent, thereby relieving the supply situation to some extent and at the same time turning the thoughts of some brokers to the possibility that lower prices may be in the offing. At the moment dealers are still paying \$8.50 a gross ton, delivered, for this grade. Railroads are shipping promptly against old sales, but many of them are still resisting prices offered. Manufacturing producers have also lost interest on account of low prices, and a number of them have openly stated that they will store scrap rather than sell it at present prices. Re-rolling rails are a drug in the market.

Prices deliv'd Chicago dist. consumers:
Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel.....	\$8.50 to \$9.00
Shovelling steel	8.50 to 9.00
Frogs, switches and guards, cut apart, and misc. rails	8.50 to 9.00
Factory hyd. comp. sheets	7.00 to 7.50
Drop forge flashings.....	6.00 to 6.50
No. 1 busheling	6.75 to 7.25
Forg'd cast and r'l'd steel carwheels	9.50 to 10.50
Railroad tires, charg. box size	10.50 to 11.00
Railroad leaf springs cut apart	11.00 to 11.50
Axle turnings	7.00 to 7.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	9.75 to 10.25
Coil springs	11.50 to 12.00
Electric Furnace Grades:	
Axle turnings	7.50 to 8.00
Low phos. punchings.....	10.75 to 11.25
Low phos. plates, 12 in. and under	10.50 to 11.00
Blast Furnace Grades:	
Cast iron borings	3.75 to 4.00
Short shovelling turnings...	3.50 to 4.00
Machine shop turnings...	3.50 to 4.00
Rolling Mill Grades:	
Re-rolling rails	10.25 to 10.75
Cupola Grades:	
Steel rails, less than 3 ft. ..	10.50 to 11.00
Steel rails, less than 2 ft. ..	11.00 to 11.50
Angle bars, steel.....	9.25 to 9.75
Cast iron carwheels.....	10.00 to 10.50
Malleable Grades:	
Railroad	9.50 to 10.00
Agricultural	9.00 to 9.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb. ..	19.00 to 21.00
*Relaying rails, 65 lb. and heavier	22.00 to 27.00
Per Net Ton	
Rolling Mill Grades:	
Iron angle and splice bars.	9.00 to 9.50
Iron arch bars and transoms	10.50 to 11.00
Iron car axles	17.50 to 18.50
Steel car axles	11.50 to 12.00
No. 1 railroad wrought... ..	7.00 to 7.50
No. 2 railroad wrought... ..	7.50 to 8.00
No. 1 busheling	6.00 to 6.50
No. 2 busheling	4.00 to 4.50
Locomotive tires, smooth... ..	11.50 to 12.50
Pipes and flues	5.50 to 6.00
Cupola Grades:	
No. 1 machinery cast.....	9.00 to 9.50
No. 1 railroad cast.....	8.00 to 8.50
No. 1 agricultural cast... ..	7.00 to 7.50
Stove plate	6.25 to 6.75
Grate bars	5.50 to 6.00
Brake shoes	5.50 to 6.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

CLEVELAND

Downward Trend of Steel Orders Still in Evidence

CLEVELAND, June 23.—The downward trend in the demand for finished steel is still in evidence. While President Hoover's plan of discontinuing payment of international obligations for one year has resulted in an improvement in sentiment, there is little expectation of upturn in the demand for steel during the next few weeks.

Local steel plant operations were further curtailed this week by the shutting down of one open-hearth furnace. Cleveland plants are now operating at 35 per cent of ingot capacity. The low point last year was 26 per cent early in July.

The recession in steel orders the past week was for the most part due to the tapering off in demand from the motor car industry, although there has been a seasonal decline in the refrigerator and some other industries. There is a general lack of interest in third quarter contracts. While a few sheet and hot-rolled strip contracts have been taken for that delivery at the announced advanced prices, consumers are able to place hot strip orders at the old prices to the end of June and specifications for sheets for shipment through July. Consequently, the new sheet schedules and the advance on hot-rolled strip will not be subjected to much of a test for several weeks. Some buyers, who recently sent out inquiries for these products are marking time. The second quarter price for steel bars has been named for the coming quarter by one or two mills, and no change is expected in structural shapes and plates or in semi-finished steel.

WAREHOUSE BUSINESS

Cleveland jobbers have reduced prices 30c. per 100 lb. on cold-finished steel to 3.10c. for rounds and hexagons and 3.60c. for squares and flats. Reductions of 25c. per 100 lb. have been made on manganese screw stock and on some grades of cold-drawn alloy bars.

PIG IRON

The volume of business continues light, with sales limited to small lots. Some of the inquiries that have come out recently evidently have been for the purpose of sounding out the market. The foundries making these inquiries, not having developed quotations below the current market prices, have confined their purchases to small lots. Among inquiries pending is one for 500 tons of foundry iron from a southern Ohio melter and another from northern Ohio for 300 to 500 tons. Prices are steady at \$16 to \$17, Lake furnace, for foundry and malleable iron for Ohio and Indiana delivery, \$17 to \$17.50 for Michigan, and \$17, furnace, for Cleveland de-

livery. Shipments to the motor car industry are tapering.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25.....	\$17.00
S'th'n fdy., sil. 1.75 to 2.25.....	17.01
Malleable	17.50
Ohio silvery, 8 per cent.....	25.00
Stand, low phos., Valley.....	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; \$3 from Jackson, Ohio; \$6.01 from Birmingham.

BOLTS AND NUTS

Following weakness in the bolt and nut market, a price revision to 73 and 10 per cent discount has been made to large buyers. The 73 per cent discount is still quoted to the smaller trade. An additional 10 per cent also is allowed on stove bolts. The new discounts probably will result in revision of some third quarter contracts that have been taken at the old prices.

SHEETS

A limited amount of business in third-quarter contracts has been taken under the new schedule of 2.40c., base, for hot-rolled annealed sheets, 3.10c. for auto body sheets and 3.35c. for metal furniture stock. However, as specifications, rather than contracts, furnish the test of the market, there has been no test of the new prices, the only actual orders under the new classification being for grades of cold-rolled sheets that have been reduced in price. A recent round-lot inquiry for barrel sheets for the third quarter is still pending. Demand continues light, although the new prices have driven out some contract tonnage. Specifications are being accepted at the old prices for shipment up to July 31. Orders from the motor car industry are tapering off. Fisher Body Corp'n. is in the market for sheets for its Cleveland plant for Chevrolet bodies for July, its requirements being sharply curtailed as compared with recent orders.

SEMI-FINISHED STEEL

Orders for sheet bars, billets and slabs are light and limited to small lots. The ruling price is \$29, Cleveland and Youngstown, and a local

producer announces that it will continue this price for the third quarter.

STRIP STEEL

Demand for hot-rolled strip continues very light. Mills are still taking orders at 1.50c., Pittsburgh, for wide strip and 1.60c. for narrow, and so far there has not been sufficient contracting at the \$1 advance for the third quarter to test the higher price for that delivery. Cold-rolled strip is unchanged at 2.15c., Cleveland.

BARS, PLATES AND SHAPES

The present steel bar price of 1.65c., Cleveland, for outside shipment and 1.70c. for local delivery has been named for the third quarter by one or two producers. Alloy steel bars will remain at 2.65c., base, for the coming quarter. The present 1.65c. Pittsburgh price for plates and shapes probably will be reestablished. However, consumers are showing no interest in prices or contracts. Demand for these products is very light. Very low prices are appearing on fabricated work. Structural lettings include 2000 tons for the Addressograph-Multigraph plant, Cleveland. Water pipe extensions in Cleveland will require about 2000 tons of plates.

OLD MATERIAL

Scrap shipments to Cleveland mills have been virtually suspended. One consumer has taken all the machine shop turnings covered by contract. A Warren mill has released limited shipments of the same material. In the absence of buying, local prices are unchanged. The market is weak on scrap for shipment to other consumers. Sales are reported at \$6 for machine shop turnings, delivered to Warren, and at \$9.75 for No. 1 heavy melting steel for Valley district delivery. Mills now are offering \$9.50 for the latter grade.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel..	\$8.50 to \$9.00
No. 2 heavy melting steel..	8.00 to 8.50
Compressed sheet steel...	7.50 to 8.00
Light bundled sheet stampings	6.50 to 7.00
Drop forge flashings....	6.75 to 7.00
Machine-shop turnings....	5.00 to 5.50
Short shoveling turnings..	6.25 to 6.75
No. 1 railroad wrought...	9.50 to 10.00
No. 2 railroad wrought...	10.00 to 10.50
No. 1 busheling	6.75 to 7.00
Pipes and flues	5.50 to 6.00
Steel axle turnings.....	7.50 to 8.00
Acid Open-Hearth Grades:	
Low phos., billet bloom and slab crops.....	14.00 to 14.50
Blast Furnace Grades:	
Cast iron borings.....	6.25 to 6.75
Mixed borings and short turnings	6.25 to 6.75
No. 2 busheling	6.00 to 6.25
Cupola Grades:	
No. 1 cast	10.00 to 10.50
Railroad grate bars.....	6.00 to 6.50
Stove plate	5.00 to 5.50
Rails under 3 ft.	15.00 to 15.50
Miscellaneous:	
Rails for rolling	13.00 to 13.50
Railroad malleable.....	11.00 to 11.25

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	2.95c.
Soft steel bars.....	2.75c.
Reinforc. steel bars.....	1.75c. to 1.95c.
Cold-fin. rounds and hex.....	3.10c.
Cold-fin. flats and sq.....	3.60c.
Hoops and bands, No. 12 to 1/2 in. inclusive	3.00c.
Hoops and bands, No. 13 and lighter	3.55c.
Cold-finished strip.....	*5.55c.
Black sheets (No. 24).....	3.60c.
Galvanized sheets (No. 24).....	4.00c.
Blue ann'l'd sheets (No. 10).....	3.00c.
No. 9 ann'l'd wire, per 100 lb.....	\$2.35
No. 9 galv. wire, per 100 lb.....	2.80
Com. wire nails, base per keg.....	2.25

*Net base, including boxing and cutting to length.

NEW YORK

Sheet Prices Cut on Eve of Advance— More Pig Iron Inquiry

NEW YORK, June 23.—Pig iron demand shows some improvement, prospective business in this territory amounting to about 5500 tons. Sales for the week totaled 3500 tons, compared with 2500 tons for the preceding week. Inquiries include 3000 tons of No. 2 plain iron for third quarter delivery for the Thatcher Co.'s Garwood, N. J., plant, where all foundry operations of the concern are now concentrated. A pump manufacturer is asking for prices on 250 tons for its Harrison, N. J., plant and 100 tons for its Holyoke, Mass., plant, for fairly prompt shipment.

Shippers report a disposition among melters to accept more frequent deliveries during the past 10 days than in the fore part of June. This is attributed to an increase in orders for castings reported by several large foundries in the territory.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	\$19.91 to \$20.41
*Buff. No. 2, del'd east, N. J.	18.28 to 18.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	17.39 to 17.89
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	17.89 to 18.39

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

CAST IRON PIPE

Demand for pressure pipe continues light, total tonnage pending amounting only to 1500 tons. Bids have been taken on 800 tons of sizes up to 10-in. pipe for Inlet, N. Y., and Ridgewood, N. J., is inquiring for 125 tons of 6-in. Lynn, Mass., awarded 200 tons of 6 and 8-in., and Boyerstown, Pa., placed 350 tons of 10-in., both contracts going to Warren Foundry & Pipe Corp. Lancaster, Pa., placed 3000 tons of 16-in. and larger pipe with Angelo Lucenti, contractor, Pittsburgh, and it is reported the order for pipe will go to a large Eastern maker. Hartford, Conn., awarded contract for 600 tons of 6 to 16-in. pipe to American Cast Iron Pipe Co.

Prices per net ton deliv'd New York:
Water pipe, 6-in. and larger, \$33.90 to \$35.90; 4-in. and 5-in., \$36.90 to \$38.90; 3-in., \$43.90 to \$45.90. Class A and gas pipe, \$3 extra.

FINISHED STEEL

Coincident with the announcements last week by several leading sheet producers of higher prices for the third quarter, a wave of selling at low prices broke out in the New York district. Prices were weakest on galvanized sheets, of which numerous sales were made at 2.65c. a lb., Pittsburgh, \$5 a ton below the price named for the third quarter and \$2 a ton below recently published prices. On

black sheets, there were some sales at 2.10c. a lb., Pittsburgh, or \$6 a ton below the price that producers are aiming to get in the next quarter. No. 10 gage sheets, rolled on continuous mills, were sold at as low as 1.60c. a lb. One company is said to have taken the initiative in this drive for business, but others were forced to meet the lower levels.

A fair amount of sheet business has been taken, both on direct orders and in specifications against second quarter contracts. However, a good deal of apathy among buyers is encountered, some not having faith in the attempt to advance prices, while others do not want to add to stocks even though they may be obliged to pay more later on. Meanwhile, the sheet mills seem determined to adhere to the new price schedule, which means a stiff advance on black and galvanized sheets over current low levels. The time when the new prices will become generally effective, however, has been postponed at least until August by the willingness of the mills to accept current specifications and orders for shipment up to the last day of July.

Makers of plates, shapes and bars are now willing to enter third quarter contracts at the prices prevailing in this quarter. These are 1.65c., Pittsburgh, and 1.75c., Eastern mill basing points. Mills find that consumers are not much interested in making contracts. On other products, prices are unchanged, with the excep-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Plats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'd sheets (No. 10)	3.00c. to 3.25c.
Black sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long term sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1/2 x 1/2 in. and larger	3.40c.
Smooth finish, 1 to 2 1/2 x 1/4 in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	Per Cent Off List
Machine bolts, cut thread:	
1/4 x 6 in. and smaller	.65 to .65 and 10
1 x 30 in. and smaller	.65 to .65 and 10
Carriage bolts, cut thread:	
1/4 x 6 in. and smaller	.65 to .65 and 10
3/4 x 20 in. and smaller	.65 to .65 and 10
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	\$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

tion of hot-rolled strip, on which mills are asking \$1 a ton above current levels.

The Jones & Laughlin Steel Corp. has received an order for 1000 tons of sheet steel piling for the New York Central freight warehouse on the lower West Side, New York, from the P. T. Cox Contracting Co., which also will buy about 1000 tons of reinforcing bars and 2000 tons of plates. The New York Central Railroad has asked for bids by June 29 on its second half steel requirements, the request covering six months instead of three months as heretofore.

REINFORCING BARS

The market on small and medium-sized tonnages of bars ranges from 1.60c. to 1.65c., Pittsburgh, or 1.93c. to 1.98c., New York, with concessions of \$1 and more a ton appearing on the more substantial contracts. New projects include highway work in Morris and Essex Counties, N. J., requiring 120 tons of bars, county bridges from Greenport, N. Y., to Shelter Island, about 350 tons, and four bridges on State parkways of Long Island calling for about 300 tons.

OLD MATERIAL

All grades of scrap are quiet, and the general trend of prices continues downward. Brokers are offering \$8, delivered to a consumer at Claymont, Del., for No. 1 heavy melting steel, while the price for this grade, on barges in New York, for delivery to Buffalo, continues at \$6.50 a ton. A consumer of heavy breakable cast at Florence, N. J., has bought a small tonnage at \$9.50 a ton, but brokers with contracts are continuing to pay \$9.50 a ton, delivered. New transactions in scrap are almost entirely in earload lots, usually sold by the holder as distress material.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$4.50 to \$6.50
Heavy melting steel (yard)	3.25 to 3.75
No. 1 hvy. breakable cast	6.50
Stove plate (steel works)	3.75 to 4.00
Locomotive grate bars	3.75 to 4.00
Machine shop turnings	2.00
Short shoveling turnings	2.00
Cast borings (blast fur. or steel works)	2.25
Mixed borings and turnings	1.75 to 2.00
Steel car axles	12.00 to 12.50
Iron car axles	16.50 to 17.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	6.00 to 6.25
Forge fire	4.50 to 5.00
No. 1 railroad wrought	8.25
No. 1 yard wrought, long	7.25
Rails for rolling	6.00 to 6.50
Stove plate (foundry)	4.50
Malleable cast (railroad)	7.50 to 8.00
Cast borings (chemical)	8.00 to 8.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	\$11.50 to \$12.00
No. 1 hvy. cast (columns, bldg. materials, etc.; cupola size)	9.50 to 10.00
No. 2 cast (radiators, cast boilers, etc.)	8.50 to 9.00

PHILADELPHIA

Steel Buying Holds at Recent Rate

PHILADELPHIA, June 23.—The volume of steel buying is unchanged. Mill operations in eastern Pennsylvania continue at about 38 per cent of capacity. Although suspensions of mill operations for mid-year repairs and inventory are expected in other districts for the early part of July, most eastern Pennsylvania mills intend closing only for the usual holiday period. The proposal by President Hoover of a one-year moratorium on war debts and reparations has brought a great improvement in sentiment.

Inquiry by consumers of sheets is improving. An automobile body builder in this district has closed contracts sufficient to maintain a fair rate of operation through the summer. Mills generally expect to quote the same prices for plates, shapes and bars in the third quarter as at the beginning of the present one, and sheet producers will quote on the new classification and bases after July 1.

Projects requiring fair tonnages of structural steel and plates are active. A low bid on seven small-capacity oil tanks for the Sun Oil Co. was submitted by the Downingtown Iron Works, Downingtown, Pa. No action has been taken as yet by the Atlantic Refining Co. on 16 oil tanks for eastern Pennsylvania and Southern States, including Maryland. An old inquiry for three fertilizer barges, requiring 4000 tons of plates and shapes, has been renewed, and shipyards are submitting new bids. The Pennsylvania Railroad has placed 90 locomotives, for which electrical equipment was recently purchased, and will shortly award about 2870 tons of electrification steel for the Wilmington to Washington line.

PLATES

Seven small tanks for the Sun Oil Co., on which a local fabricator was low bidder, will require about 200 tons of plates, and fertilizer barges, on which shipyards are quoting, call for about 3000 tons of plates. Quotations are unchanged at 1.75c. a lb., Coatesville, Pa., or 1.85½c., Philadelphia, with concessions of \$1 a ton usually granted on requirements ranging in excess of 100 tons.

PIG IRON

Eastern Pennsylvania furnaces are quoting \$16.50 a ton, furnace, on carload lots of foundry iron, but are still inclined to shade the usual differential of 50c. a ton for No. 2X grade to 25c. a ton. Recent purchases of foundry iron have included a carload of charcoal and 100 tons of No. 1X and high manganese foundry iron for the Baltimore & Ohio Railroad and about 100 tons of No. 2X for the Southern Railway. Birmingham furnaces are main-

taining \$11 a ton, furnace, on foundry iron, or \$16.25 a ton, on dock, Philadelphia. With steel mill operations curtailed, basic iron is quiet. Shipments of Indian basic are still arriving to complete a contract with an eastern Pennsylvania consumer.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$17.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	17.76
East. Pa. No. 1X, 1.75 to 2.25 sil.	18.26
Basic (del'd east. Pa.), 1.75 to 2.25 sil.	17.25
Malleable, low phos. (f.o.b. east. Pa. furnace), 23.00 to 24.00	20.00
Cop. br'g low phos. (f.o.b. furnace), 22.00 to 23.00	23.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$1.54 from Virginia furnaces.

STEEL BARS

On current small purchases, the price is unchanged at 1.65c. a lb., Pittsburgh, or 1.94c., Philadelphia, with deliveries on some second quarter contracts at 1.60c., Pittsburgh, or 1.89c., Philadelphia. Billet steel reinforcing bars are 1.60c. to 1.65c., Pittsburgh, or 1.89c. to 1.94c., Philadelphia, with concessions of \$1 and more a ton on desirable contracts. Rail steel bars continue at 1.20c. to 1.30c., Pittsburgh, or 1.49c. to 1.59c., Philadelphia. Projects in the market include 450 tons for a sewage disposal plant at Kline Island, Allentown, Pa., and 296 tons in a grade crossing elimination for the Reading Railroad.

SHEETS

Inquiry from local consumers of sheets is improving, although it is generally limited to lots of a few tons each. Black sheets are at 2.20c. a lb., Pittsburgh, or 2.49c., Philadelphia, with concessions to 2.15c., Pittsburgh, or 2.44c., Philadelphia, on desirable business. Galvanized sheets lack firmness at 2.75c., Pittsburgh, or 3.04c., Philadelphia, for small lots, and 2.70c., Pittsburgh, or 2.99c., Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform.	2.50c. to 2.60c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to ¾-in. inclu.	2.90c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.40c.
*Galvanized sheets (No. 24)	3.85c.
Light plates, blue annealed (No. 10)	3.05c.
Blue ann'd sheets (No. 13)	3.20c.
Diam. pat. floor plates, ¼-in.	5.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 16 to 49 bun., 3.65c. base; 1 to 9 bun., 3.90c. base.
†For 50 bundles or more; 16 to 49 bun., 4.29c. base; 1 to 9 bun., 4.55 base.

delphia, for distributors and large users. In the Southern territory, galvanized sheets have been sold at 2.65c., Pittsburgh. Blue annealed sheets, No. 13 gage, are quoted at 2c., Pittsburgh, or 2.29c., Philadelphia, and blue annealed plates, No. 10 gage, at 1.85c., Pittsburgh, or 2.14c., Philadelphia.

SHAPES

Fabricating shops are bidding on bridges and similar construction for railroads and public works, including 2000 tons for a grade crossing elimination by the Reading Railroad and a total of 17,000 tons in the overhead express highway near Newark, N. J., being constructed by the New Jersey State Highway Commission. Shape prices are unchanged at 1.70c. to 1.75c. a lb., f.o.b. nearest mill to consumer, or 1.76c. to 1.81c., Philadelphia.

IMPORTS

In the week ended June 20, 95 tons of structural shapes arrived from Belgium.

OLD MATERIAL

Dealers and brokers are generally paying \$8 a ton, delivered eastern Pennsylvania mills, for No. 1 heavy melting steel, and the consumer at Bethlehem, Pa., has purchased fair tonnages of this grade at \$8.50 a ton, delivered. Deliveries of No. 1 steel are being made to the consumer at Claymont, Del., on old contracts. A tonnage of heavy breakable cast scrap has been bought by a consumer at \$10 a ton, and a foundry at Florence, N. J., has closed on a small tonnage of this grade at \$9.50 a ton, delivered. Other grades are quiet.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	\$8.00 to \$9.00
No. 2 heavy melting steel	7.00
Heavy melting steel (yard)	6.50
No. 1 railroad wrought	10.00 to 10.50
Bundled sheets (for steel works)	6.50
Hydraulic compressed, new	7.50 to 8.50
Hydraulic compressed, old	6.50 to 7.00
Machine shop turnings (for steel works)	5.00 to 6.00
Heavy axle turnings (or equiv.)	8.00 to 8.50
Cast borings (for steel works and roll. mill)	5.00 to 6.00
Heavy breakable cast (for steel works)	9.50 to 10.00
Railroad grate bars	8.00
Stove plate (for steel works)	8.00
No. 1 low phos. hvy. (0.04% and under)	12.00 to 13.00
Couplers and knuckles	11.00 to 11.50
Roller steel wheels	10.00 to 11.00
No. 1 blast fnace (nom.)	4.50
Wrot. iron and soft steel pipe and tubes (new specific)	11.00 to 11.50
Shafting	16.50 to 17.00
Steel axles	16.00 to 16.50
No. 1 forge fire	8.00 to 8.50
Cast iron carwheels	12.00 to 12.50
No. 1 cast	11.00 to 11.50
Cast borings (for chem. plant)	12.00 to 12.50
Steel rails for rolling	10.50 to 11.00

BOSTON

BOSTON, June 23.—A new low record for weekly pig iron sales was established the past week when less than 500 tons was booked. The only prospective business is 250 tons of No. 2X iron wanted by a Bath, Me., shipbuilder. The New England melt continues to ease off.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25...	\$19.91 to \$20.91
*Buffalo, sil. 2.25 to 2.75...	19.91 to 20.91
†Buffalo, sil. 1.75 to 2.25...	19.28 to 20.28
†Buffalo, sil. 2.25 to 2.75...	19.28 to 20.28
*Ala., sil. 1.75 to 2.25...	20.11 to 20.61
*Ala., sil. 2.25 to 2.75...	20.61 to 21.11
†Ala., sil. 1.75 to 2.25...	16.75
†Ala., sil. 2.25 to 2.75...	17.25

Freight rates: \$4.91 all rail from Buffalo; \$9.61 all rail from Alabama and \$5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

FABRICATED STEEL

Lettings total 2075 tons, the best week in some time. Included in lettings were 980 tons for a State bridge at Wiscasset, Me., to the American Bridge Co., and 143 tons for a Palmyra, Me., bridge and 50 tons for a Willimantic, Me., bridge to the Pan-American Bridge Co. Aside from 1500 tons for a Worcester, Mass., war memorial building and approximately 500 tons for a Providence, R. I., courthouse addition, tonnages now being figured are small.

REINFORCING STEEL

Quite a representative tonnage is being figured, but individual items are usually small. It is understood that 200 tons of steel for State road work will be let this week, and 200 tons for schoolhouses and 150 tons for a city printing plant will be let next week. Otherwise there is nothing of size in sight. Billet bars from stock are: One to 5-ton lots, 3c. a

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.36 1/4c.
Structural shapes—	
Angles and beams.....	3.36 1/4c.
Tees	3.36 1/4c.
Zees	3.36 1/4c.
Soft steel bars, small shapes.....	3.26 1/4c.
Reinforcing bars.....	3.11 1/4c. to 3.26 1/4c.
Iron bars—	
Refined	3.26 1/4c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 5.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	3.50c. to 5.50c.
Squares and flats.....	4.00c. to 6.00c.
Toe calk steel	6.00c.
Rivets, structural or boiler.....	4.80c.

Per Cent Off List

Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts	60 and 5
Cold-punched nuts	60 and 5
Stove bolts	70 and 10

Pig Iron Sales at Low Point—Scrap Prices Decline

lb., base; 6 to 99 tons, 2.40c.; 100-ton lots and larger, 2.20c. Rail steel bars for Boston delivery are 2.26 1/2c. a lb.

CAST IRON PIPE

Cast iron pipe business is not up to expectations. Many towns which contemplated installing water works systems have temporarily abandoned such projects, owing to excessive rains so far this year, while cities are buying only as demand requires and then in the smallest possible quantities. The one important sale the past week was 600 tons to Hartford, Conn., by the American Cast Iron Pipe Co. Weston, Mass., is in the market for 14-in. pipe, and another Massachusetts municipality this week will close bids on a round tonnage. The average price asked for Class B pipe is \$34 a ton, foundry, but on attractive tonnages concessions of \$1 to \$2 a ton can be obtained. Full differentials on Class A and gas pipe are not always obtained.

OLD MATERIAL

The American Steel & Wire Co., Worcester, Mass., practically the only

source of business for brokers today, has made a further reduction of 50c. a ton on the materials it consumes. The company is now paying \$6.50 a ton, delivered, for No. 1 heavy melting steel and T rails, \$5.50 a ton for bundled skeleton and \$9 a ton for low phosphorus scrap. Otherwise the scrap market is dead. Some brokers have orders for breakable cast, but say holders of this material are not disposed to sell at prevailing prices.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel..	\$4.00 to \$4.25
Scrap T rails.....	4.00 to 4.25
Scrap girder rails.....	3.00 to 3.25
No. 1 railroad wrought...	7.00 to 7.50
Machine shop turnings...	0.60 to 0.80
Cast iron borings (steel works and rolling mill)	0.60 to 1.00
Bundled skeleton, long....	3.00 to 3.25
Forge flashings	5.00 to 5.25
Blast furnace borings and turnings	1.00
Forge scrap	0.50 to 0.80
Shafting	10.00 to 10.50
Steel car axles	11.00 to 12.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	5.00 to 5.25
Rails for rolling.....	7.50 to 8.00
Cast iron borings, chemical	7.00 to 7.25
No. 2 cast	5.00 to 5.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	\$9.50 to \$10.00
No. 1 machinery cast....	9.50 to 10.00
Stove plate	5.00 to 5.25
Railroad malleable	13.00 to 13.50

BIRMINGHAM

Pig Iron Business Drags—A Moderate Gain in Steel Orders

BIRMINGHAM, June 23.—The pig iron market continues to drag. Demand is no better. Shipments are showing further decline. Aside from the pipe foundries, which are operating at about 50 per cent, the melt is very low and uncertain. Some small foundries are operating only occasionally. No interest has yet developed for third quarter tonnage, and local furnaces have not booked any business of consequence for that period. Consumers with unused commitments will have them extended. Quotations for district deliveries are still on a \$12 to \$13 base. Twelve blast furnaces are in operation, no changes having taken place since June 10, when the Gulf States Steel Co. blew out its furnace.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil..	\$12.00 to \$12.00
No. 1 fdy., 2.25 to 2.75 sil..	12.50 to 13.50
Basic	12.00 to 13.00

CAST IRON PIPE

Conditions are the same as for some weeks past, with the expected seasonal tonnage still absent. In the midst of what is normally their most active season, pressure pipe plants are obtaining only small orders, and even these are not very numerous. Plant operations average about 50 per cent.

Base prices are unchanged at \$35 to \$36.

FINISHED STEEL

One steel company reports a very much better week, with an increase in both new tonnage and inquiries. Current business of fabricators of structural steel and reinforcing bars is still mostly in small lots. An exception is a 200-ton order for bridge material placed with the Virginia Bridge & Iron Co. by the Louisville & Nashville Railroad for use at Henderson, Ky. Open-hearth operations last week were at the same rate as for the preceding one, with the Tennessee company having 10 to 11 furnaces active and the Gulf States Steel Co. two.

OLD MATERIAL

The market is unusually quiet, with virtually no buying.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$9.50 to \$10.00
Scrap steel rails.....	10.00
Short shoveling turnings..	7.50
Cast iron borings.....	(No market)
Stove plate.....	7.60
Steel axles	15.00 to 16.00
Iron axles	18.00
No. 1 railroad wrought...	8.00
Rails for rolling.....	11.50 to 12.00
No. 1 cast	9.50
Tramcar wheels	10.00 to 10.25
Cast iron borings, chem...	13.50

ST. LOUIS

General Trend of Markets Is Toward Midsummer Dullness

ST. LOUIS, June 23.—The pig iron market continues exceedingly dull, with buying confined to a few carload lots. Steel mills have further curtailed operations because of small order files, the warm weather and the approach of the holidays. Prices are unchanged, but melters are little concerned as to prices, and concessions probably would not stimulate buying. Business with malleable plants is light.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	15.42
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

FINISHED STEEL

Railroads centering in St. Louis have asked for prices on their third quarter requirements of plates, shapes, bars and sheets, which may or may not mean anything. However, as buying during the first and second quarters was so very small, mills are hoping that there will be a need for a larger tonnage during the next three months. Structural fabricators are said to be operating on a basis of 40 per cent of capacity.

OLD MATERIAL

About the only scrap coming into this market is being shipped by the railroads. Country dealers say that the prices are too low to ship stocks on hand or to buy scrap from others. Dealers here say that because of this shortage they have become extremely cautious in making short sales. Consumers in the district are buying very little. The only change in the list is a reduction of 50c. in the price of cast iron borings and shoveling turnings, in line with a recent purchase by the largest user of this item in the district.

Railroad lists: Chicago, Burlington

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.15c.
Bars, soft steel or iron	3.00c.
Cold-fn. rounds, shafting, screw stock	3.35c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Blue ann'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	3.85c.
Galv. corrug. sheets	4.40c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, $\frac{7}{8}$ -in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60 and 10
Carriage bolts	60 and 10
Lag screws	60 and 10
Hot-pressed nuts, sq., blank or tapped	
200 lb. or more	60 and 10
Less than 200 lb.	50 and 10
Hot-pressed nuts, hex., blank or tapped	
200 lb. or more	60 and 10
Less than 200 lb.	50 and 10

& Quincy, 3605 tons; Union Pacific, 3000 tons; Chesapeake & Ohio, 2113 tons; Chicago & Eastern Illinois, 77 carloads; Missouri Pacific and Nashville, Chattanooga & St. Louis, eight carloads each; Pullman Co., St. Louis, three carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	\$8.25 to \$8.75
No. 1 heavy melting or shoveling steel	8.00 to 8.50
No. 2 heavy melting or shoveling steel	7.25 to 7.75
No. 1 locomotive tires	10.00 to 10.50
Misc. stand-sec. rails including frogs, switches and guards, cut apart	9.00 to 9.50

YOUNGSTOWN

YOUNGSTOWN, June 22.—Specifications for finished steel products reaching Valley mills this month are reflecting the gradual curtailment which had been generally expected in the industry. Sheet and strip releases have been affected more than other lines because of the decided falling off in the requirements of the automobile industry, but the demands of other consuming groups have also shown some seasonal recession.

Orders for line pipe will offset the decline in other lines to some extent. The Youngstown Sheet & Tube Co. has taken an order for 41,000 tons of 26-in. electrically welded pipe from an unidentified buyer and will ship the material before Sept. 1. This will improve plate mill operations and also help to sustain ingot operations. The remainder of the district's pipe capacity is engaged at a low rate.

Steel production is still declining, and ingot output this week will not be better than 35 per cent of theoretical capacity. Finishing mill schedules do not average much higher, although tin plate production in this district is still at about 65 per cent of capacity. Sheet and strip production has declined most markedly, with sheet mills engaged at about 35 per cent and strip capacity at a considerably lower rate. Operations have been suspended at the sheet mill at Newton Falls, and capacity at Niles and Warren is engaged in a very interrupted way. Some further suspensions are expected next month.

Consumers of steel are showing little interest in their third quarter requirements, and Valley mills are not pressing them for contracts. On bars and plates, it is possible to renew old contracts with little difficulty, and no formal price advance is contemplated. Makers of strip steel have taken some third quarter tonnage at higher prices announced recently, with 1.55c. and 1.65c., Pittsburgh, applying to hot-rolled strip, and 2.15c. on cold-rolled. On current orders for

Railroad springs	10.00 to 10.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	6.00 to 6.50
Cast iron borings and shoveling turnings	5.00 to 5.50
Iron rails	8.00 to 8.50
Rails for rolling	10.00 to 10.50
Machine shop turnings	2.75 to 3.25
Heavy turnings	6.00 to 6.50
Steel car axles	12.50 to 13.00
Iron car axles	17.50 to 18.00
Wrot. iron bars and trans.	8.75 to 9.25
No. 1 railroad wrought	5.50 to 6.00
Steel rails, less than 3 ft.	11.00 to 11.50
Steel angle bars	8.50 to 9.00
Cast iron carwheels	7.00 to 7.50
No. 1 machinery cast	8.00 to 8.50
Railroad malleable	8.00 to 8.50
No. 1 railroad cast	8.00 to 8.50
Stove plate	7.00 to 7.50
Relay. rails, 60 lb. and under	16.00 to 16.50
Relay. rails, 70 lb. and over	20.00 to 21.00
Agricult. malleable	7.50 to 8.00

Recession in Business Affects Sheet and Strip Most Seriously

hot-rolled material prices \$1 a ton less are occasionally encountered.

Valley makers of sheets are showing considerable interest in the adoption of the new schedules announced in May by the American Rolling Mill Co. The base prices sought are just now being given their first test, and some confusion prevails in the market. However, producers seem to be asking 2.40c., Pittsburgh, on black sheets, 2.90c. on galvanized, 3.10c. on auto body and 1.90c. and 2.05c. on light plates and blue annealed sheets. Tonnage contracted for at the old prices must be shipped by the end of July, and thus mills are giving themselves another 30 days before a real test of the market.

No new developments have occurred in the raw materials market. Valley mills have not been able to compete successfully with Pittsburgh district steel companies on recent large orders for basic pig iron. Quotations have been entered on some of this business, but have not been low enough. The market on other grades of iron seems to be well maintained at \$17, Valley furnace. Scrap quotations are weak, with the market on the heavy melting steel quotable at about \$10.

Hilton Steel Co., engineer and plate fabricator, Warren, Ohio, has been organized under the direction of Jack L. Hilton, president and treasurer, formerly manager of contractors' equipment division, Commercial Shearing & Stamping Co., Youngstown, and superintendent of Heltzel Steel Form Co., Warren. A. F. Steele, formerly associated with Brainard Steel Corp., Warren, and with Wells Fargo Express Co., is secretary of the Hilton company. R. A. Zeyfang, another associate in the new organization, was previously assistant shop superintendent, Dalzell Brothers Co., Youngstown, prior to which he was with Commercial Shearing & Stamping Co.

CINCINNATI

CINCINNATI, June 23.—Consumption of pig iron in this district continues at about the level of the past two months. Lack of inventories is tending to keep the demand at a level of from 1500 to 2000 tons weekly. Bookings last week were about 1900 tons, of which 500 tons of Northern foundry iron was sold to a south central Ohio consumer. Foundries are still operating at a low rate.

Prices per gross ton, del'd Cincinnati:
Ala. fdy., sil. 1.75 to 2.25.....\$14.69
Ala. fdy., sil. 2.25 to 2.75..... 15.19
Tenn. fdy., sil. 1.75 to 2.25..... 14.69
S't'n Ohio silvery, 8 per cent..... 23.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

WAREHOUSE BUSINESS

Jobbers report business to be slow. Prices on several items have been reduced. The quantity differential minimum also has been changed to allow lower quotations on quantities from 1000 to 7999 lb., instead of 4000 to 7999 lb. as heretofore.

FINISHED STEEL

Reflecting the usual seasonal recession, demand for sheets in this area has tapered. Fresh bookings last week were slightly below those of the preceding week, although the demand continues to be well diversified. Production has been lowered in keeping with demand. District mills are now operating at less than 50 per cent of capacity.

OLD MATERIAL

With only one or two mills in the district accepting shipments of scrap,

Pig Iron Buying Steady But Not Increasing—Scrap Lower

Warehouse Prices, f.o.b. Cincinnati

	Base per lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.00c.
New billet reinf. bars.....	3.00c.
Rail steel reinf. bars.....	3.00c.
Hoops.....	3.90c.
Rods.....	3.20c.
Cold-fin. rounds and hex.....	3.50c.
Squares.....	4.00c.
Black sheets (No. 24).....	3.75c.
Galv. sheets (No. 24).....	4.25c.
Blue ann'd sheets (No. 10).....	3.50c.
Structural rivets.....	4.20c.
Small rivets.....	.60 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg (25 kegs or more).....	2.95
Cement c'd nails, base 100 lb. keg.....	2.95
Chain, per 100 lb.....	10.25
Net per 100 Ft.	
Lap-welded steel boiler tubes, 2-in., 4-in.....	\$16.50
Seamless steel boiler tubes, 2-in., 4-in.....	17.50
Seamless steel boiler tubes, 2-in., 4-in.....	36.00

shipments are slow. New orders are negligible. Prices are soft. Reductions in dealers' bids on several items have been made.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$7.25 to \$7.75
Scrap rails for melting.....	10.25 to 10.75
Loose sheet clipping.....	3.50 to 4.00
Bundled sheets.....	6.75 to 7.25
Cast iron borings.....	3.75 to 4.25
Machine shop turnings.....	4.00 to 4.50
No. 1 busheling.....	5.75 to 6.25
No. 2 busheling.....	3.75 to 4.25
Rails for rolling.....	11.00 to 11.50
No. 1 locomotive tires.....	9.50 to 10.00
No. 2 railroad wrought.....	7.25 to 7.75
Short rails.....	13.00 to 13.50
Cast iron carwheels.....	10.50 to 11.00
No. 1 machinery cast.....	12.50 to 13.00
No. 1 railroad cast.....	11.50 to 12.00
Burnt cast.....	5.25 to 5.75
Stove plate.....	5.25 to 5.75
Brake shoes.....	5.25 to 5.75
Agricultural malleable.....	10.00 to 10.50
Railroad malleable.....	11.00 to 11.50

PACIFIC COAST

SAN FRANCISCO, June 20.—Bids were opened this week on the largest structural project ever to come up for figures on the Pacific Coast, namely, the Golden Gate bridge to be built over San Francisco Bay, which will take 110,000 tons of steel. The aggregate of the various bids, for the job complete, was more than \$2,000,000 below the engineers' estimates. The McClintic-Marshall Corp. was low bidder on the main span and towers, involving 72,000 tons, and the American Cable Co. was low bidder on the steel cables.

Demand generally has shown little improvement.

BARs

Awards exceeded 1200 tons and included 420 tons for the Sloat Boulevard viaduct, San Francisco, placed with W. S. Wetenhall Co., and 250 tons for a church in the same city, booked by Gunn, Carle & Co. More

Bids Opened on Golden Gate Bridge, Requiring 110,000 Tons of Steel

Pig iron prices per gross ton at San Francisco:

*Utah basic.....	\$22.00 to \$24.00
*Utah fdy., sil. 2.75 to 3.25.....	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25.....	22.00 to 24.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

than 300 tons of paving work in California was taken by unnamed interests. New inquiries include 150 tons for a theater in Alameda. Approximately 3000 tons is involved in the foundations and approaches for the

Warehouse Prices, f.o.b. San Francisco

	Base per lb.
Plates and struc. shapes.....	2.50c.
Soft steel bars.....	2.50c.
Black sheets (No. 24).....	4.15c.
Blue ann'd sheets (No. 10).....	3.05c.
Galv. sheets (No. 24).....	4.65c.
Struc. rivets, 1/2-in. and larger.....	5.00c.
Com. wire nails, base per keg.....	\$3.35
Cement c'd nails, 100 lb. keg.....	3.35

Golden Gate bridge. Out-of-stock prices in San Francisco continue at 2.60c., base, on carload lots, while Los Angeles quotations hold at 2.50c., base.

PLATES

With the exception of a few tank and tower projects, involving lots of less than 100 tons, nothing of importance has developed in the plate market for some weeks. No award has yet been made of 500 tons for 24 and 30-in. welded steel pipe for Vancouver, B. C. Quotations continue at 2c., c.i.f.

SHAPES

More than 2500 tons of structural shapes was placed this week. The Consolidated Steel Corp. booked 1715 tons for a bridge over the Santa Clara River in Ventura County, Cal., and 304 tons of H columns went to an unnamed mill. The Dominion Bridge Co. took 700 tons for the second Narrows bridge, Vancouver, B. C. McClintic-Marshall's bid on 72,000 tons for the Golden Gate bridge towers and main span was \$10,494,000. The Columbia Steel Co.'s bid for the approach spans was \$996,000 and its bid on the main span and tower was only slightly more than \$150,000 above McClintic-Marshall's bid. The American Cable Co. bid \$6,255,767 for 28,000 tons of steel wire. It appears that the combined bids of the Columbia Steel Co. for the various units is the low bid. No action is expected to be taken until after July 1. New inquiries include 400 tons for a plant for the Vermont Marble Co., San Francisco. Plain material ranges from 2.05c. to 2.15c., c.i.f.

CAST IRON PIPE

The only award of importance this week went to an unnamed interest and involved 270 tons of 16-in. Class 150 pipe for the San Pedron sewer, Los Angeles. The American Cast Iron Pipe Co. booked 100 tons for several street improvement projects in Seattle. Bids have been opened on 105 tons of 2-in. pipe for Long Beach, on 208 tons of 2 to 12-in. Class 150 pipe for Fairfield, Cal., and on 241 tons of 4 and 6-in. Class B pipe for La Conner, Wash. Burbank, Cal., has opened bids on 233 tons of 6 to 18-in. Class B or centrifugal pipe. San Bernardino, Cal., will open bids June 23 on 810 tons of 20-in. Class 250 pipe. Bids will be opened June 30 on 968 tons for a water system for Boulder City, Nev., calling for 2 to 12-in. Class B pipe. San Francisco and Oakland will open bids June 29 and July 8 respectively on 2096 tons of 4 to 12-in. Class B pipe and 2365 tons of 2 to 8-in. Class B or 150 pipe.

SHEETS

Movement continues to be confined to small lots. Prices on No. 24 gage galvanized sheets hold at 3.50c., c.i.f. Black sheets No. 24 gage are quoted at 3c., and No. 10 gage blue annealed sheets hold at 2.50c., c.i.f.

BUFFALO Steel Operations Up Slightly—Pig Iron Dull—Scrap Weaker

BUFFALO, June 23.—The pig iron market is extremely quiet. The total amount of iron booked in this district the past week is estimated at 2500 to 3000 tons. An Eastern melter is in the market for several thousand tons of foundry iron, this being the only inquiry of consequence.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.....	\$17.00
No. 2X fdy., sil. 2.25 to 2.75.....	17.50
No. 1 fdy., sil. 2.75 to 3.25.....	18.50
Malleable, sil. up to 2.25.....	17.50
Basic.....	17.00
Lake Superior charcoal.....	25.28

FINISHED STEEL

The Lackawanna plant of the Bethlehem Steel Corp. has increased its open-hearth operation from eight furnaces to 10. Republic Steel continues to operate four open-hearths. Wickwire Spencer is operating three and the Gould Coupler Works is operating one on part time. The Seneca Iron & Steel Co. is operating at about 40 per cent, as is the Buffalo Bolt Co. A considerable volume of reinforcing bars in small lots has been placed.

OLD MATERIAL

The leading consumer has again lowered its offering price for various grades of scrap. It is now offering \$9 for No. 1 heavy melting steel and \$7.50 for No. 2 heavy melting steel. Prices on other steel-making grades are weaker in sympathy.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel.....	\$9.00 to \$9.50
No. 2 heavy melting scrap.....	7.50 to 8.00
Scrap rails.....	10.00 to 10.50
Hydraulic comp. sheets.....	7.50 to 8.00
No. 2 hydraulic comp. sheets.....	7.00 to 7.50
Hand bundled sheets.....	7.00
Drop forge flashings.....	7.50 to 8.00
No. 1 busheling.....	7.50 to 8.00
Hvy. steel axle turnings.....	8.50 to 9.50
Machine shop turnings.....	4.50 to 5.00
No. 1 railroad wrought.....	7.50 to 8.00

Acid Open-Hearth Grades:	
Knuckles and couplers.....	12.00 to 12.50
Coil and leaf springs.....	12.00 to 12.50
Rolled steel wheels.....	12.00 to 12.50
Low phos. billet and bloom ends.....	13.00 to 14.00

Electric Furnace Grades:	
Short shov. steel turnings.....	6.00 to 6.50

Blast Furnace Grades:	
Short mixed borings and turnings.....	6.00 to 6.50
Cast iron borings.....	6.00 to 6.50
No. 2 busheling.....	4.50 to 5.00

Rolling Mill Grades:	
Steel car axles.....	15.00 to 15.50
Iron axles.....	16.00 to 16.50

Warehouse Prices, f.o.b. Buffalo

Base per Lb.	
Plates and struc. shapes.....	3.25c.
Soft steel bars.....	3.00c.
Reinforcing bars.....	2.65c.
Cold-fin. flats and sq.....	3.65c.
Rounds and hex.....	3.15c.
Cold-rolled strip steel.....	5.25c.
Black sheets (No. 24).....	3.70c.
Galv. sheets (No. 24).....	4.10c.
Bands.....	3.35c.
Hoops.....	3.90c.
Blue ann'd sheets (No. 10).....	3.50c.
Com. wire nails, base per keg.....	\$2.60
Black wire, base per 100 lb.....	3.20

Cupola Grades:	
No. 1 machinery cast.....	10.00 to 10.50
Stove plate.....	8.00 to 8.25
Locomotive grate bars.....	7.00 to 7.50
Steel rails, 3 ft. and under.....	13.00 to 13.50
Cast iron carwheels.....	11.50 to 12.00

Malleable Grades:	
Industrial.....	10.00 to 10.50
Railroad.....	10.00 to 10.50
Agricultural.....	10.00 to 10.50

Special Grades:	
Chemical borings.....	9.00 to 9.50

Canada

Dominion Iron and Steel Markets Are Dull

TORONTO, June 23.—No pig iron booking is being done for third quarter delivery. Melters appear to be showing a stronger tendency to hold purchases of pig iron to a hand-to-mouth basis. Some second quarter contracts will be carried through to third quarter, but local blast furnace representatives do not look for much in the way of long term contracts. Spot demand is holding up fairly well, although sales are confined mostly to lots of one or two cars.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75.....	\$22.60
No. 2 fdy., sil. 1.75 to 2.25.....	22.10
Malleable.....	22.60

Sheet Prices Under New Classification

New base prices for sheet mill products, under the new classification, are now being quoted by mills on new business and are to take full effect on third quarter contracts.

The term "hot-rolled" annealed replaces such designations heretofore described as "one-pass cold-rolled," "box annealed," "black sheets," "blue annealed."

The term "cold-rolled sheets" takes the place of "single pickled cold-rolled" and "full pickled cold-rolled."

New base prices are as follows:

Per Lb., Pittsburgh	
Hot-rolled, No. 10 gage.....	1.70c.
Hot-rolled annealed, No. 24.....	2.40c.
Heavy cold-rolled, No. 10.....	2.35c.
Cold-rolled, No. 20.....	2.95c.
Automobile body sheets, No. 20.....	3.10c.
Heavy furniture sheets, No. 10.....	2.75c.
Light furniture sheets, No. 20.....	3.35c.
(Prices on furniture stock include stretcher leveling but not resquaring.)	
Galvanized sheets, No. 24.....	2.90c.
Long ternes, unassorted, No. 24.....	3.15c.

Usual differential over Pittsburgh base prices of \$2 a ton applies on all of these grades at Chicago district mills.

Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75.....	\$24.00
No. 2 fdy., sil. 1.75 to 2.25.....	23.50
Malleable.....	24.00
Basic.....	20.50

STRUCTURAL STEEL

Awards made during the week were in lots under 500 tons, although several contracts are pending which will involve orders up to 5000 or 6000 tons. Several new building projects have been announced lately, and it is expected that these will stimulate structural steel sales later in the year. Bridge construction continues to furnish the largest demand for steel.

OLD MATERIAL

The demand for iron and steel scrap continues dull. Mills are picking up scrap from the railways, but are taking little from the dealers. Dealers are out of the market and have made no revision in prices.

Dealers' buying prices for old material:
Per Gross Ton

	Toronto	Montreal
Heavy melting steel.....	\$7.00	\$6.00
Rails, scrap.....	7.00	6.00
No. 1 wrought.....	6.00	8.00
Machine shop turnings.....	2.00	2.00
Roller plate.....	5.00	4.50
Heavy axle turnings.....	2.50	2.50
Cast borings.....	2.00	2.00
Steel borings.....	2.00	2.00
Wrought pipe.....	2.00	2.00
Steel axles.....	7.00	9.00
Axles, wrought iron.....	7.00	11.00
No. 1 machinery cast.....	—	10.00
Stove plate.....	—	8.00
Standard carwheels.....	—	8.50
Malleable.....	—	8.00

Per Net Ton	
No. 1 mach'y cast.....	11.00
Stove plate.....	9.00
Standard carwheels.....	10.00
Malleable scrap.....	9.00

Canal Zone Dam to Take 6600 Tons of Steel

WASHINGTON, June 23.—Approximately 6600 net tons of steel will be required for the Madden dam project, Canal Zone. The tonnage is divided as follows: Reinforcement bars, 1900; gates, hoists, and other metal work, 3250; structural steel, 745; small metal pipe and fittings, 360; large metal conduits, 350. Invitations for general bids were sent out on Monday of last week by the canal commission. The bids will be opened Sept. 1.

A discussion of the principal features and service records of the complete Curtiss and Wright lines of airplane engines, with special reference to materials used in their construction is contained in a 12-page pamphlet entitled "The Curtiss and Wright Engines." Numerous illustrations are included showing views of the different engine models, of important parts, and of planes in which these engines are installed. Copies obtainable on request from the International Nickel Co., Inc., 67 Wall Street, New York.

▲▲ Semi-Finished Steel, Raw Materials, Bolts and Rivets ▲▲

MILL PRICES OF SEMI-FINISHED STEEL

Billets and Blooms	
	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	\$29.00 to \$30.00
Rerolling, 4-in. and under 10-in., Youngstown	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Cleveland	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Chicago	31.00 to 32.00
Forging quality, Pittsburgh	35.00 to 36.00

Sheet Bars	
	Per Gross Ton
(Open-Hearth or Bessemer)	
Pittsburgh	\$29.00 to \$30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

Slabs	
	Per Gross Ton
(8 in. x 2 in. and under 10 in. x 10 in.)	
Pittsburgh	\$29.00 to \$30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

Skelp	
	Per Lb.
(F.o.b. Pittsburgh or Youngstown)	
Grooved	1.65c.
Universal	1.65c.
Sheared	1.65c.

Wire Rods	
	Per Gross Ton
(Common soft, base)	
Pittsburgh	\$35.00
Cleveland	35.00
Chicago	35.00

PRICES OF RAW MATERIAL

Ores	
	Per Gross Ton
Lake Superior Ores, Delivered Lower Lake Ports	
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore	
	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria. 8c. to 9c.	
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic or foundry, Swedish, average 65% iron	9.00c.
Manganese ore, washed 52% manganese, from the Caucasus	25c. to 27c.
Manganese ore, African or Indian, 50 to 52% manganese	24c. to 26c.
Manganese ore, Brazilian, 46 to 48% manganese	22c. to 24c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$12.00 to \$12.50

Per Gross Ton	
Chrome ore, 45% Cr ₂ O ₃ crude, c.i.f. Atlantic seaboard	\$20.00
Chrome ore, 48% Cr ₂ O ₃ crude, c.i.f. Atlantic seaboard	22.50

Coke	
	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.40
Foundry, f.o.b. Connellsville prompt	\$3.25 to 4.75
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd.	10.50
Foundry, by-product, Newark or Jersey City, delivered	8.70 to 9.10
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal	
	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.50
Mine run coking coal, f.o.b. W. Pa. mines	1.50
Gas coal, 3 $\frac{1}{2}$ -in., f.o.b. Pa. mines	1.80
Mine run gas coal, f.o.b. Pa. mines	1.60
Steam slack, f.o.b. W. Pa. mines	90c.
Gas slack, f.o.b. W. Pa. mines	1.10

Ferromanganese	
	Per Gross Ton
Domestic, 80%, seaboard	*\$80.00 to \$85.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*\$80.00 to 85.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen	
	Per Gross Ton Furnace
Domestic, 19 to 21%	\$28.00 to \$30.00

Electric Ferrosilicon	
	Per Gross Ton Delivered
50%	\$83.50
75%	130.00

Per Gross Ton	
10%	\$35.00
11%	37.00
Furnace	
12%	\$39.00
14 to 16%	31.00

Bessemer Ferrosilicon	
	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
10%	\$25.00
11%	26.00
12%	27.00

Silvery Iron	
	Per Gross Ton
F.o.b. Jackson County, Ohio, Furnace	
6%	\$19.00 to \$21.00
7%	19.50 to 21.50
8%	20.00 to 22.00
9%	20.50 to 22.50
10%	21.00 to 23.00
11%	\$22.00 to \$24.00
12%	23.00 to 25.00
13%	25.00 to 27.00
14%	27.00 to 29.00
15%	29.00 to 31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys	
	Per lb. contained metal
Ferrotungsten, per lb. contained metal del'd. carloads	\$1.08
Ferrotungsten, less carloads	\$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr, per lb. contained Cr, delivered, in carloads	11.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	24.50c. to 26.00c.
Ferrochromium, 0.06% carbon	26.50c. to 28.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltititanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferrophosphorus, electric, 24%, f.o.b. Aniston, Ala., per gross ton	122.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50

Silico-manganese, gross ton, delivered:	
2.50% carbon grade	\$105.00
1% carbon grade	115.00
Spot prices	\$5 a ton higher

Fluxes and Refractories	
	Per Net Ton
Fluorspar	
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$14.00
No. 2 lump, Illinois and Kentucky mines	17.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 $\frac{1}{2}$ % silicon, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick	
	Per 1000 f.o.b. Works
High-Heat	Intermediate
Duty Brick	Heavy Duty Brick
Pennsylvania	\$40.00 to \$43.00
Maryland	40.00 to 43.00
New Jersey	40.00 to 43.00
Ohio	40.00 to 43.00
Kentucky	40.00 to 43.00
Missouri	40.00 to 43.00
Illinois	40.00 to 43.00
Ground fire clay, per ton	6.50

Silica Brick	
	Per 1000 f.o.b. Works
Pennsylvania	\$45.00
Chicago	49.00
Birmingham	47.00
Silica clay, per ton	8.00

Magnesite Brick	
	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick	
	Per Net Ton
Standard size	\$45.00

MILL PRICES OF BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts	
	Per Cent Off List
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Machine bolts	73 and 10
Carriage bolts	73 and 10
Lag bolts	73 and 10
Flow bolts, Nos. 1, 2, 3 and 7 heads	73 and 10
Hot-pressed nuts, blank or tapped, square	73 and 10
Hot-pressed nuts, blank or tapped, hexagons	73 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	73 and 10
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including $\frac{1}{4}$ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts	
	Per Cent Off List
Semi-finished hexagons nuts	73 and 10
Semi-finished hexagons castellated nuts, S.A.E.	73 and 10
Stove bolts in packages, P'gh. 80, 10, 10, 10 and 5	
Stove bolts in packages, Ch'go. 80, 10, 10, 10 and 5	
Stove bolts in pkgs., Cleveland 80, 10, 10, 10 and 5	
Stove bolts in bulk, P'gh. 80, 10, 10, 10, 5 and 2 $\frac{1}{2}$	
Stove bolts in bulk, Ch'go. 80, 10, 10, 10, 5 and 2 $\frac{1}{2}$	
Stove bolts in bulk, Cleveland	
Tire bolts	80, 10, 10, 10, 5 and 2 $\frac{1}{2}$
Discounts of 73 and 10 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.	

Large Rivets	
	Base per 100 Lb.
($\frac{1}{2}$ -in. and larger)	
F.o.b. Pittsburgh or Cleveland	\$2.75
F.o.b. Chicago	2.85

Small Rivets	
	Per Cent Off List
($\frac{1}{8}$ -in. and smaller)	
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws	
	Per Cent Off List
(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)	
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel		Base per Lb.
F.o.b. Pittsburgh mill	.....	1.65c.
F.o.b. Chicago	.....	1.70c. to 1.80c.
Del'd Philadelphia	.....	1.94c. to 1.99c.
Del'd New York	.....	1.98c. to 2.03c.
F.o.b. Cleveland	.....	1.65c. to 1.70c.
F.o.b. Lackawanna	.....	1.75c. to 1.80c.
F.o.b. Birmingham	.....	1.70c. to 1.75c.
C.i.f. Pacific ports	.....	2.10c.
F.o.b. San Francisco mills	.....	2.10c.

Billet Steel Reinforcing		Base per Lb.
F.o.b. P'gh mills, 40, 50, 60-ft.	.....	1.60c. to 1.65c.
F.o.b. Birmingham, mill lengths	.....	1.75c.
Rail Steel		Base per Lb.
F.o.b. mills, east of Chicago dist.	.....	1.30c. to 1.35c.
F.o.b. Chicago Heights mill	.....	1.60c. to 1.65c.
Del'd Philadelphia	.....	1.84c. to 1.89c.

Iron		Base per Lb.
Common iron, f.o.b. Chicago	.....	1.70c. to 1.80c.
Refined iron, f.o.b. P'gh mills	.....	2.75c.
Common iron, del'd Philadelphia	.....	2.09c.
Common iron, del'd New York	.....	2.14c.

Tank Plates

Base per Lb.	
F.o.b. Pittsburgh mill	..... 1.65c.
F.o.b. Chicago	..... 1.70c. to 1.80c.
F.o.b. Birmingham	..... 1.70c. to 1.75c.
Del'd Cleveland	..... 1.83 1/2c.
Del'd Philadelphia	..... 1.85 1/2c.
F.o.b. Conestoga	..... 1.75c.
F.o.b. Sparrows Point	..... 1.75c.
F.o.b. Lackawanna	..... 1.75c.
Del'd New York	..... 1.93c.
C.i.f. Pacific ports	..... 2.00c.

Structural Shapes

Base per Lb.	
F.o.b. Pittsburgh mill	..... 1.65c.
F.o.b. Chicago	..... 1.70c. to 1.80c.
F.o.b. Birmingham	..... 1.70c.
F.o.b. Lackawanna	..... 1.75c.
F.o.b. Bethlehem	..... 1.75c.
Del'd Cleveland	..... 1.83 1/2c.
Del'd Philadelphia	..... 1.76c. to 1.81c.
Del'd New York	..... 1.90 1/2c.
C.i.f. Pacific ports	..... 2.05c.

Hot-Rolled Hoops, Bands and Strips

Base per Lb.	
6 in. and narrower, P'gh	..... 1.60c. to 1.65c.
Wider than 6 in., P'gh	..... 1.50c. to 1.55c.
6 in. and narrower, Chicago	..... 1.65c. to 1.75c.
Wider than 6 in., Chicago	..... 1.55c. to 1.65c.
Cooperage stock, P'gh	..... 1.80c. to 1.90c.
Cooperage stock, Chicago	..... 1.80c. to 1.90c.

Cold-Finished Steel

Base per Lb.	
Bars, f.o.b. Pittsburgh mill	..... 2.10c.
Bars, f.o.b. Chicago	..... 2.10c.
Bars, Cleveland	..... 2.10c.
Bars, Buffalo	..... 2.10c.
Shafting, ground, f.o.b. mill	..... 2.45c. to 3.40c.
Strips, P'gh	..... 2.15c.
Strips, Cleveland	..... 2.15c.
Strips, deliv'd Chicago	..... 2.43c.
Strips, Worcester	..... 2.30c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	..... 3.20c.

*According to size.

Wire Products

To Manufacturing Trade		Base per Lb.
Bright wire	.....	2.20c.
Spring wire	.....	3.20c.
To Jobbing Trade		Base per Lb.
Smooth annealed wire	.....	2.25c. to 2.35c.
Smooth galvanized wire	.....	2.70c. to 2.80c.
Polished staples	.....	2.25c. to 2.35c.
Galvanized staples	.....	2.50c. to 2.60c.
Barbed wire, galvanized	.....	2.45c. to 2.55c.
Woven wire fence, per net ton	.....	\$60.00

<i>To Jobbing Trade</i>		<i>Base per Lb.</i>
Smooth annealed wire.....	2.25c.	to 2.35c.
Smooth galvanized wire.....	2.70c.	to 2.80c.
Polished staples	2.25c.	to 2.35c.
Galvanized staples	2.50c.	to 2.60c.
Barbed wire, galvanized.....	2.45c.	to 2.55c.
Woven wire fence, per net ton	\$60.00	
		<i>Base per Keg</i>
Standard wire nails		\$1.80
Smooth coated nails		1.80
Galvanized nails		3.80
<i>To Retail Trade</i>		

Anderson, Ind., mill prices are ordinarily \$1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

(Sheet prices under the old classification, as shown below, are applicable only on orders or specifications placed this month. On all new business for delivery after July 1 the new prices, printed on the second page preceding, will apply.)

Light Plates

Base per Lb.	
No. 10, blue annealed, f.o.b. P'gh	..... 1.85c.
No. 10, blue annealed, f.o.b. Chicago dist.	..... 1.95c.
No. 10, blue an'd, del'd Phila.	..... 2.14c. to 2.19c.
No. 10, blue annealed, B'ham	..... 1.85c.
No. 10, blue annealed, Pacific Coast ports	..... 2.50c.

Sheets

Blue Annealed		Base per Lb.
No. 13, f.o.b. P'gh	.....	2.00c.
No. 13, f.o.b. Chicago dist.	.....	2.10c.
No. 13, del'd Philadelphia	.....	2.29c.
No. 13, blue annealed, B'ham	.....	2.15c.

Box Annealed, One Pass Cold Rolled		Base per Lb.
No. 24, f.o.b. Pittsburgh	.....	2.15c.
No. 24, f.o.b. Chicago dist. mill	.....	2.35c.
No. 24, del'd Philadelphia	.....	2.44c. to 2.54c.
No. 24, f.o.b. Birmingham	.....	2.40c.
No. 24, c.i.f. Pacific Coast ports	3.00c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh 3.40c.
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Galvanized		Base per Lb.
No. 24, f.o.b. Pittsburgh	2.70c. to 2.80c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 2.90c.
No. 24, del'd Cleveland	.....	2.93 1/2c. to 2.98 1/2c.
No. 24, del'd Philadelphia	.....	3.04c. to 3.09c.
No. 24, f.o.b. Birmingham	.....	2.85c. to 2.90c.
No. 24, c.i.f. Pacific Coast ports	.....	3.50c.

Continuous Mill Sheets

No. 10 gage	..... 1.70c.
No. 13 gage	..... 1.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	..... 2.55c. to 2.65c.
No. 28, f.o.b. Chicago dist. mill 2.65c. to 2.75c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh 3.00c. to 3.10c.
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Long Ternes

No. 24, 8-lb. coating, f.o.b. mill 3.10c.
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Unassorted 3.20c.

Assorted 3.20c.

Primes only 3.30c.

Vitreous Enameling Stock

No. 10, Pittsburgh	..... 2.90c. to 3.10c.
No. 20, Pittsburgh	..... 3.40c. to 3.60c.

Tin Plate

Base per Box	
Standard cokes, f.o.b. P'gh district mills	..... \$5.00
Standard cokes, f.o.b. Gary	..... 5.10

Terne Plate

(F.o.b. Morgantown or Pittsburgh)	
(Per Package, 20 x 24 in.)	
8-lb. coating I.C. \$10.30	25-lb. coating I.C. \$15.20
15-lb. coating I.C. 12.90	30-lb. coating I.C. 16.00
20-lb. coating I.C. 14.00	40-lb. coating I.C. 17.80

Alloy Steel Bars

(F.o.b. maker's mill)	
Alloy Quantity Bar Base, 2.65c. per Lb.	
S.A.E. Series Numbers	Differential
2000 (1 1/4% Nickel)	..... \$0.25
2100 (1 1/2% Nickel)	..... 0.55
2300 (3 1/2% Nickel)	..... 1.50
2500 (5% Nickel)	..... 2.25
3100 Nickel Chromium	..... 0.55
3200 Nickel Chromium	..... 1.35
3300 Nickel Chromium	..... 3.80
3400 Nickel Chromium	..... 3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	..... 0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	..... 0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	..... 1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	..... 0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	..... 0.45
5100 Chromium Spring Steel	..... 0.20
6100 Chromium Vanadium Bar	..... 1.20
6100 Chromium Vanadium Spring Steel	..... 0.95
9250 Silicon Manganese Spring Steel (flats)	..... 0.25
Rounds and squares	..... 0.50
Chromium Nickel Vanadium	..... 1.50
Carbon Vanadium	..... 0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 1/4c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Rails

Per Gross Ton	
Standard, f.o.b. mill	..... \$43.00
Light (from billets), f.o.b. mill	..... 34.00
Light (from rail steel), f.o.b. mill	..... 32.00

Track Equipment

Base per 100 Lb.	
Spikes, 3/4 in. and larger	..... \$2.70
Spikes, 1/2 in. and larger	..... 2.70
Spikes, boat and barge	..... \$2.90
Tie plate, steel	..... 1.95
Angle bars	..... 2.75
Track bolts, to steam railroads	..... \$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	..... 73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills	
Butt Weld	
Inches	Steel
1 1/2	47
2	53
2 1/2	58
3	62
3 1/2	64
4	64
4 1/2	64
5	64
5 1/2	64
6	64
6 1/2	64
7	64
7 1/2	64
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94	64

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Metal Prices Up—Export Copper Sales Heavy— Lead Still Active

NEW YORK, June 23, 1931.

COPPER

Stimulated by the proposal of a moratorium on foreign debts and reparations, the market developed considerable activity on Monday afternoon, especially export sales. These totaled 18,000,000 lb. to London on Tuesday, with no revision of the 8.52½c., c.i.f., price quoted by Copper Exporters, Inc. These sales brought the total export business since June 1 to 99,500,000 lb., equal to the exports in April and May combined. Buying by domestic consumers was stimulated also, and the price of primary producers, which had stood at 8c. a lb., delivered in the Connecticut Valley, for more than a week, with minor sales by second hands at 7.75c., delivered, advanced Monday afternoon to 8.25c. a lb. and was generally maintained at this level by all sellers on Tuesday. Following the advance of the market by ¼c. a lb. producers of brass products and wire cable made corresponding advances of ¼c. a lb. in their products on Tuesday. Prior to the advance in the price, some tonnage was sold for September delivery at 8c., delivered Connecticut Valley. Lake copper continued quiet, but the price was advanced on Monday afternoon from 8.12½c., delivered, to which it had declined on June 18, to 8.37½c.

TIN

The meeting of a committee of tin producers in Paris during the week apparently reached no decision to form a pool, but merely affirmed the previous decision of a similar meeting of producers at The Hague, which had agreed on production quotas of 8820 tons to July 1. Buying was light during the week until the end, when a slight improvement developed, and the price in London advanced about £3 a ton, bringing today's price on spot standard to £108 17s. 6d., with future standard at £110 10s., and spot Straits at £110 10s. The Singapore price today was £110 12s. 6d. Although the market here advanced in sympathy with activity in other metals, stimulated by the general reaction to proposal of a moratorium on international debts, buying continued on a moderate scale, most consumers

	THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY					
	June 23	June 22	June 20	June 19	June 18	June 17
Lake copper, New York.....	8.37½	8.12½	8.12½	8.12½	8.12½	8.37½
Electrolytic copper, N. Y.*.....	8.00	7.75	7.75	7.75	7.75	7.75
Straits tin, spot, N. Y.	23.95	24.10	....	23.00	22.70	22.70
Zinc, East St. Louis.....	3.50	3.45	3.35	3.35	3.35	3.30
Zinc, New York.....	3.85	3.80	3.70	3.70	3.70	3.65
Lead, St. Louis.....	3.97½	3.82½	3.60	3.60	3.60	3.60
Lead, New York.....	4.15	4.00	3.75	3.75	3.75	3.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

having covered nearby requirements at previous lower prices. Stocks in British warehouses for the week ended Saturday, June 20, were 31,894 tons, an increase of 528 tons from the previous week. Shipments from the Straits up to June 20 totaled 5800 tons, of which 1825 tons is reported for the past week.

LEAD

Heavy buying developed on Monday, stimulated by an advance in price of \$5 a ton to 4c. a lb., followed by a second advance on Tuesday of \$3 a ton to 4.15c., New York, and 3.97½c., East St. Louis. Buying by cable makers, corrodors, battery makers and tin foil, sheet lead and pipe producers was heavier even than

in previous weeks. Immediate need of supplies was indicated, with but little buying for other than prompt or July shipment.

ZINC

Following an advance of 15 points in price a week ago to 3.40c., East St. Louis, brought about by reports of projected curtailment of output, the market advanced \$1 a ton to 3.45c. a lb., on Monday and to 3.50c. on Tuesday. Buying for prompt shipment continues light, but the latest advances in the price have stimulated some inquiry for August or September delivery at the present market price, or a five point premium. Production remained steady this week, and sales have shown no definite in-

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass.....	15.62½c.
*Copper, hot rolled, base sizes.....	18.12½c.
<i>Seamless Tubes—</i>	
Brass.....	20.50c.
Copper.....	20.62½c.
Brass Rods.....	13.87½c.
Brass Tubes.....	24.25c.

*Extra for cold-rolled, 3c. per lb.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks.....	9.00c. to 9.50c.
Zinc sheets, open.....	10.00c. to 10.50c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	26.00c. to 27.00c.
Tin, bar.....	28.00c. to 29.00c.
Copper, Lake.....	10.00c. to 10.50c.
Copper, electrolytic.....	9.50c. to 10.00c.
Copper, casting.....	9.25c. to 9.75c.
Zinc, slab.....	4.50c. to 5.50c.
Lead, American pig.....	5.00c. to 6.00c.
Lead, bar.....	6.75c. to 7.75c.
Antimony, Asiatic.....	9.00c. to 10.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure).....	20.00c. to 22.00c.
Alum. ingots, No. 12 alloy.....	19.00c. to 21.00c.
Babbitt metal, commercial grade.....	20.00c. to 30.00c.
Solder, ½ and ½.....	18.00c. to 19.00c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig.....	28.00c.
Tin, bar.....	30.00c.
Copper, Lake.....	10.25c.
Copper, electrolytic.....	9.50c.
Copper, casting.....	9.00c.
Zinc, slab.....	5.50c.
Lead, American pig.....	4.75c. to 4.90c.
Lead, bar.....	7.75c.
Antimony, Asiatic.....	10.00c.
Babbitt metal, medium grade.....	15.00c.
Babbitt metal, high grade.....	32.00c.
Solder, ½ and ½.....	19.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.50c.	7.25c.
Copper, hvy. and wire	6.25c.	7.00c.
Copper, light and bottoms.....	5.25c.	6.00c.
Brass, heavy.....	3.50c.	4.25c.
Brass, light.....	2.75c.	3.75c.
Hvy. machine composition	5.25c.	6.00c.
No. 1 yel. brass turnings.....	3.75c.	4.50c.
No. 1 red brass or compos. turnings..	4.50c.	5.25c.
Lead, heavy.....	2.75c.	3.25c.
Zinc.....	1.25c.	1.75c.
Sheet aluminum.....	9.50c.	11.50c.
Cast aluminum.....	3.50c.	6.00c.

crease, despite greater activity in other metals.

ANTIMONY

Buying continues small, but, in sympathy with the rather general advance in other metal prices, antimony is quoted at 6.25c. a lb., duty paid, New York, an increase of 20 points. Even at this price, however, little of the Chinese metal is being offered for either prompt or forward shipment, and sellers believe a sizable inquiry

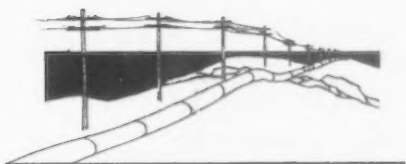
would bring a further advance in the price.

NICKEL

Electrolytic cathodes are quoted at 35c. a lb., and shot and ingot nickel from remelted electrolytic at 36c. a lb. for single lots, spot shipment.

ALUMINUM

According to published prices, virgin metal, 98 to 99 per cent pure, is 22.90c. a lb., delivered.



PIPE LINES

Order for 41,000 Tons and Another for 17,000 Tons Placed

PIPE line business has taken a spurt in the past week. Two large orders, one of 41,000 tons and another of 17,000 tons, were placed, while prospective tonnage runs into quite large figures. In addition to having better domestic prospects, American pipe mills probably will share in orders for 175,000 tons of pipe for a line in Asia. Details of the week's developments follow:

Shell Oil Corp., has ordered approximately 200 miles of 10½-in. seamless pipe, calling for 17,000 tons of steel, from the Jones & Laughlin Steel Corp., Pittsburgh. The line will extend from the east Texas fields to an unnamed Texas city.

Great Northern Power Co., Chicago, has placed an order for 41,000 tons of 26-in. gas line, to be laid in east Texas, with the Youngstown Sheet & Tube Co.

Peoples Gas Co., Pittsburgh, is in the market for 120 miles of 20-in. (22,000 tons) for a natural gas line in western Pennsylvania.

Irak Petroleum Co., which combines American, British and French oil groups interested in developing the Mosul oil fields, will shortly place orders against an inquiry for 175,000 tons of 12½-in. seamless pipe to convey oil from the Tigris River to the ports of Tripoli in Syria and Jaffa in Palestine. American mills are expected to share in the business. Purchases of \$13,650,000 worth of materials have already been made and by the time that wells have been drilled and the pipe line is laid nearly \$500,000,000 will have been invested. The work will be pushed for the next four years and it is hoped that the first oil will be pumped to the seaports by 1935.

Shamrock Oil & Gas Co., Pittsburgh, contemplates construction of a pipe line from Willis Springs, Tex., in the east Texas fields, to Houston which, with gathering lines, would require about 225 miles of pipe, principally 12½-in. material. The line would be designed for use by independent east Texas oil operators. Tonnage required is indefinite.

Lycorning Natural Gas Co., a subsidiary of the Standard Oil Co. of New Jersey, is expected to make formal inquiry during the next week for approximately 25,000 tons of 20-in. pipe, to be used for a line in northern Pennsylvania and southern New York.

City of Cleveland will take bids June 26 on 1500 to 1800 tons of 48, 50 and 56-in. pipe, alternative proposals being asked for riveted, welded and "Lock bar" type of pipe.

Manufacturers Light & Heat Co., Pittsburgh, has applied for Federal permission to build two 8-in. gas pipe lines across back channel of Ohio River, between Groveton and Neville Island.

Phoenix Utility Co., 2 Rector Street, New York, will install natural gas pipe line of Pennsylvania Power & Light Co., Allentown, Pa., from Tioga County oil field to Williamsport and vicinity, about 60 miles. Line will be operated by Susquehanna Gas Co., a subsidiary.

Physical Properties Obtainable in Hot-Rolled Seamless Tubes

(Concluded from page 2046)

self adaptable to use under high-temperature service; the plain high-chromium steels, being subject to embrittlement, are consequently of not much value.

A somewhat more recent development in line with these steels has been the introduction of a low-chromium steel—of approximately 4 to 6 per cent chromium content. This, being of lower price and still exhibiting increased resistance to corrosion, is beginning to find considerable favor. In some respects this steel is very attractive, possessing air hardening properties and consequently a wide range in physical properties. It has usually been found advantageous to limit the carbon content of this analysis to not over 0.20 or 0.25 per cent, on account of the air hardening properties.

Heat Treatment Is of Value

It is possible, however, by the use of an annealing process, to vary the properties of a 0.15 per cent carbon, maximum, 4 to 6 per cent chromium

steel, from about 60,000 to 65,000 lb. to the square inch ultimate strength to as high as 125,000 or 150,000 lb. These higher physical properties are, of course, not always retained in service, especially where such service is of a high-temperature nature. The effect of temperature over a period of time is to anneal the tube and reduce the properties to that of a soft-annealed one of 60,000 to 65,000 lb. to the square inch.

While complete experimental work has not been completed on this steel, preliminary data indicate that a resistance to oxidation over that of mild steel is obtained in this analysis, as well as a slightly higher tensile strength at elevated temperatures. There is also a resistance to corrosion of three to eight times that of mild-carbon steel, depending, of course, on the conditions of service to which the material is subjected.

"First Great Constructive Move for Recovery"

Commenting on President Hoover's plan for war debt suspension, Myron C. Taylor, chairman, finance committee, United States Steel Corp., who recently returned from Europe, said:

"I consider the move for a holiday on reparations and war debt payments as the first great constructive move we have made for the world's economic recovery, and this should be fully appreciated abroad."

Simplified practice recommendation R28-29 covering sheet steel has been reaffirmed by the standing committee of the industry, without change, for another year, according to an announcement by the division of simplified practice of the Bureau of Standards, Department of Commerce. This recommendation provides for stock sizes of sheet steel in various gages, and has been instrumental in reducing variety from 1809 sizes to 209, or by approximately 88 per cent.

"Sheet Iron—a Primer," a booklet issued by the Republic Steel Corp., is an ABC of the sheet metal industry, telling in non-technical language the story of iron-working and describing, step by step, modern commercial practice of sheet rolling. This booklet, now in its fourth edition, is published primarily for use in schools giving courses in sheet-metal work, and is already in classroom use in more than 1200 schools and universities in the United States and Canada.

FABRICATED STRUCTURAL STEEL

New Projects of 44,000 Tons Include 11,000-Ton Highway Section—Awards Total 34,000 Tons

NEW projects and awards of fabricated structural steel show a slight improvement this week, with inquiry at 44,000 tons, compared with 35,000 tons a week ago, and awards 34,000 tons this week, against 24,000 tons a week ago. New business includes 11,000 tons for a new section of an elevated express highway in New Jersey, 4000 tons for the Reading Railroad, of which 2000 tons is for a coal breaker and 2000 tons for grade crossing elimination, and 2850 tons of electrification steel for the Pennsylvania Railroad.

Awards of the week include 20,000 tons in a bridge over the Ohio River for the Louisville & Nashville Railroad, 2000 tons for a building in Cleveland for Addressograph-Multigraph and 1000 tons in a bridge at Lake Charles, La. Railroad bridges in Persia, requiring 2080 tons of fabricated steel, have been awarded to the McClintic-Marshall Corp., which is low bidder for the Golden Gate bridge in San Francisco. Awards follow:

North Atlantic States

WISCASSET-EDGEComb, ME., 980 tons, State bridge, to American Bridge Co.
PROVINCETOWN, MASS., 230 tons, stand-pipe, to Pittsburgh-Des Moines Steel Co.
PORTLAND, ME., 200 tons, Court House addition, to a Western fabricator.
BARTLETT, N. H., 170 tons, State bridge, to Kiltredge Bridge Co.
EVERETT, MASS., 150 tons, New England Fuel & Transportation Co. coal breaker, to an unnamed fabricator.
PALMYRA AND WILLIMANTIC, ME., 193 tons, two State bridges, to Pan American Bridge Co.
HINSDALE, MASS., 100 tons, State bridge, to Boston Bridge Works, Inc.
STATE OF MAINE, 250 tons, bridge, to Pittsburgh-Des Moines Steel Co.
STATE OF NEW YORK, 150 tons, highway bridge, to American Bridge Co.
STATE OF NEW YORK, 100 tons, one of four bridges bid on June 9, to Lackawanna Structural Steel Co.
NEW YORK, 200 tons, Pleasant Valley substation for New York Power & Light Corp., to Lehigh Structural Steel Co.
NEW YORK, 440 tons, subway route 106, section 11, to McClintic-Marshall Corp.
BROOKLYN, 200 tons, parochial school for Church of the Good Shepherd on Brown Street, to George A. Just Co.
BROOKLYN, 180 tons, St. Patrick's parochial school, to Lehigh Structural Steel Co.
CORLESKILL, N. Y., 350 tons, grade crossing elimination, to McClintic-Marshall Corp.
CAYUTA, N. Y., 205 tons, Lehigh Valley bridge, to McClintic-Marshall Corp.
CROTON, N. Y., 105 tons, bridge for Boston & Maine Railroad, to Shoemaker Bridge Co.
VALHALLA, N. Y., 120 tons, Grasslands Hospital, to McClintic-Marshall Corp.
SAVANNAH, N. Y., 400 tons, New York Central Railroad bridge, to McClintic-Marshall Corp.
STATE OF NEW JERSEY, 142 tons, highway bridge, to Belmont Iron Works.
LANCASTER, PA., 900 tons, water tank, to McClintic-Marshall Corp.
MEDIA, PA., 100 tons, bridge over Darby Creek, to American Bridge Co.
READING RAILROAD, 220 tons, station at Jenkintown, Pa., to Frank M. Weaver & Co.

The South

LOUISVILLE & NASHVILLE RAILROAD, 20,000

tons, bridge over Ohio River at Henderson, Ky., to American Bridge Co.
GRATZ, KY., 350 tons, bridge, to Vincennes Bridge Co.
CHESAPEAKE & OHIO RAILROAD, 900 tons, bridge at Fort Springs, W. Va., to American Bridge Co.
LAKE CHARLES, LA., 1000 tons, bridge, to an unnamed fabricator.

Central States

CLEVELAND, 2000 tons, Addressograph-Multigraph Corp., to Pittsburgh Bridge & Iron Co.
SANTA FE RAILROAD, 100 tons, extension to crane runways, to McClintic-Marshall Corp.
CHICAGO, 150 tons, Fine Arts Building, to McClintic-Marshall Corp.

Western States

ALAMEDA, CAL., 115 tons, theater, to Golden Gate Iron Works.
OAKLAND, CAL., 110 tons, Howard Terminal building, to Moore Dry Dock Co.
OAKLAND, 100 tons, plant addition for Paraffine Companies, to Moore Dry Dock Co.
SAN QUENTIN, CAL., 100 tons, mess hall for State prison, to Golden Gate Iron Works.
SAN FRANCISCO, 147 tons, Epp apartment building, to Herrick Iron Works.
PASADENA, CAL., 100 tons, shop building for Junior College, to McClintic-Marshall Corp.
SACRAMENTO, 304 tons, H columns for bridge over Santa Clara River in Ventura County, to unnamed bidder.
LOS ANGELES, 120 tons, school addition, Wilson Avenue, to Consolidated Steel Corp.
HOLLISTER, CAL., 100 tons, bank, to Schrader Iron Works.

Canada

SAULT STE. MARIE, ONT., 250 tons, store for T. Eaton Co., Toronto, to Hamilton Bridge Co.

Export

PERSIA, 2080 tons, bridges for Southern State Railways, to McClintic-Marshall Corp.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

BOSTON, 350 tons, city printing plant.
BOSTON, 100 tons, branch libraries at Brighton and Jamaica Plain.

WAVERLY, MASS., 100 tons, Nurses' Home.
CAMBRIDGE, MASS., 107 tons, underpass at end of Harvard bridge.

NEWTOWN, CONN., 2000 tons, State hospital.

READING COMPANY, 4000 tons, including 2000 tons for coal breakers being built by Stone & Webster Engineering Corp., and 2000 tons for a grade crossing elimination on Germantown-Chestnut Hill line.

STATE OF NEW JERSEY, 11,000 tons, new section of express highway on route 25; bids open July 6.

PENNSYLVANIA RAILROAD, 2870 tons, two inquiries for electrification steel on line from Wilmington, Del., to Washington.
NEW YORK, 350 tons, public school No. 129, College Point.

NEW YORK, 175 tons, bathing pavilion at Rlis Park, Rockaway.

NEW YORK, 140 tons, convent of St. John the Baptist on East Seventy-fifth Street.

PEEKSKILL, N. Y., 750 tons, highway grade crossing for State of New York.

STATEN ISLAND, N. Y., 500 tons, municipal buildings.

BERGEN COUNTY, N. J., 1000 tons, County administration building.

WASHINGTON, 750 tons, power plant and appurtenant works, Madden Dam project, Canal Zone; general bids opened Sept. 1 in Washington.

BUFFALO, 1100 tons, four viaducts for city; Independent Bridge Co. low bidder on one viaduct, 250 tons; E. P. Laufer Corp., low bidder on three.

ERIE, PA., 800 tons, refrigerator plant for General Electric Co.

ERIE, 300 tons, Post Office; bids rejected, to be readvertised.

The South

DANVILLE, TENN., 2500 tons, bridge for Louisville & Nashville Railroad.

LOUISVILLE, KY., 2400 tons, Post Office; bids opened June 22.

ALEXANDRIA, LA., 1170 tons, Red River bridge.

SHREVEPORT, LA., 2500 tons, Red River bridge.

MONROE, LA., 1200 tons, Ouachita River bridge.

BRYAN JUNCTION, TEX., 1000 tons, bridge.

Central States

TOLEDO, 200 tons, Dime Savings Bank.

STATE OF OHIO, 150 tons, three highway bridges.

DETROIT, 1000 tons, grade crossing separation for Pere Marquette Railroad.

STATE OF ILLINOIS, 2900 tons, bridges; Clinton Bridge Works low bidder on 1300 tons, International Steel & Iron Co. low on 800 tons.

ELMHURST, ILL., 400 tons, viaduct.

WHITE FISH BAY, WIS., 400 tons, high school.

Western States

POMONA, CAL., 175 tons, grandstand for Los Angeles County fair grounds; bids rejected.

SAN FRANCISCO, 400 tons, plant for Vermont Marble Co.; bids being taken.

SAN FRANCISCO, 107,000 tons, Golden Gate bridge; McClintic-Marshall Corp. low bidder on 72,000 tons for main span and towers; Columbia Steel Co. low on 6800 tons for approaches, and American Cable Co. low on 28,000 tons of wire for suspension cables.

Canada

ASHCROFT, B. C., 1000 tons, bridge over Thompson River for Provincial Department of Public Works, Victoria, B. C.

Reinforcing Steel

New Projects Still Gaining—Awards Also Higher

NEW reinforcing steel projects will require 11,600 tons, the largest total for any week since March 26. Included in new jobs is 2660 tons for the Golden Gate bridge at San Francisco, on which bids have been opened, 2600 tons for State highway work in Illinois and 1900 tons for a Canal Zone dam and power plant. Awards, at 4000 tons, compare with 2550 tons in the previous week. The largest letting was 650 tons for a sewer at Sheepshead Bay, New York. Awards follow:

NEW YORK, 650 tons, sewer at Sheepshead Bay, to Igoe Brothers.
NEW YORK, 220 tons, sewer on Tieman Avenue, Borough of Bronx, to Concrete Steel Co.
WASHINGTON, 730 tons, Capitol terrace foundations and garage, to Concrete Steel Co.
WASHINGTON, 140 tons, bakery and warehouse for Walter Reed Hospital, to Concrete Steel Co.
WASHINGTON, 100 tons, waterside drive overpass bridge, Potomac parkway, to Capital Fireproof Products Corp.
WILLOUGHBY, OHIO, 100 tons, highway bridge, to Truscon Steel Co.
CLEVELAND, 120 tons, tuberculosis hospital, to Truscon Steel Co.
SPRINGFIELD, ILL., 300 tons, State road work, to Calumet Steel Co.
CHICAGO, 200 tons, Mannheim Road viaduct, to an unnamed bidder.
SAN FRANCISCO, 250 tons, church on Funston Avenue, to Gunn, Carle & Co.
SAN FRANCISCO, 420 tons, Sloat Boulevard viaduct, to W. S. Wetenhall Co.
SACRAMENTO, CAL., 240 tons, paving in Colusa County, to an unnamed bidder.
LOS ANGELES, 100 tons, apartment building on La Fayette Park Place, to an unnamed bidder.
LOS ANGELES, 100 tons, apartment building at Fernwood Street and St. Andrews Place, to an unnamed company.
LOS ANGELES, 100 tons, warehouse for Braun Corp., to an unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 200 tons, schools.
BOSTON, 150 tons, city printing plant.
READING COMPANY, 296 tons, grade crossing elimination on Germantown-Chestnut Hill line.
ALLENTOWN, PA., 450 tons, sewage disposal plant on Kline Island.
STATE OF NEW YORK, Long Island State Parkway Commission, 300 tons, bridges on Northern State Parkway, Southern State Parkway and at Massapequa, N. Y.
PREEKSILL, N. Y., 390 tons, bridge for County Park Commission.
SUFFOLK COUNTY, N. Y., 350 tons, bridges between Shelter Island and Greenport; bids open July 7.

STATE OF NEW JERSEY, 120 tons, highway construction on route 10, section 2, in Morris and Essex Counties; bids open July 6.

WASHINGTON, 1900 tons, power plant and appurtenant works, Madden Dam project, Canal Zone; general bids opened Sept. 1.

JAMESTOWN, N. Y., 100 to 125 tons, Erie Railroad passenger station.

CLEVELAND, 300 tons, Columbus road bridge; new bids July 22.

TORONTO, OHIO, 185 tons, road work; Middle States Construction Co., Columbus, general contractor.

HOWELL, IND., 1000 tons, bridge.

MILWAUKEE, 500 tons, building for Swift & Co., indefinitely postponed.

CHICAGO, 250 tons, Marshall Field Estate building.

CHICAGO, 200 tons, sewage treating plants, for nearby lakeshore villages.

SPRINGFIELD, ILL., 2600 tons, State highway work, let to several contractors.

SAN FRANCISCO, 2658 tons, Golden Gate bridge; bids opened.

ALAMEDA, CAL., 150 tons, theater; bids being taken.

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Prices of Scrap Are Lower at Detroit

DETROIT, June 23.—Although heavy melting steel has declined another 25c. a ton the past week, there are indications that prices have reached their lowest point, with a strong possibility that July scrap lists of motor car makers will bring higher bids. No. 1 busheling is off 50c. a ton and hydraulic bundles, sheet clips and flashings 25c. Stove plate is down 50c. a ton, although quotations are largely nominal. Borings and short turnings are 25c. a ton higher on account of a shortage of this item in this district.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	\$6.75 to \$7.25
Borings and short turnings	3.75 to 4.25
Long turnings	3.00 to 3.50
No. 1 machinery cast	8.25 to 8.75
Automotive cast	11.00 to 11.50
Hydraul. comp. sheets	6.00 to 6.50
Stove plate	5.75 to 6.25
New No. 1 busheling	5.50 to 6.00
Old No. 2 busheling	2.50 to 3.00
Sheet clippings	3.50 to 4.00
Flashings	5.75 to 6.25

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American Materials Only for Texas Public Work

Declaring that it has come to its notice that imported steel and cement have been used extensively by persons securing contracts for construction work for the State, the Texas Legislature has passed a resolution requiring the use in that State of American-made materials on the construction of roads, bridges and public buildings for the State.

Railroad Equipment

Pennsylvania Awards 90 Electric Locomotives

Orders for the construction of mechanical parts, or chassis, of 90 electric locomotives have been awarded by the Pennsylvania Railroad. The Westinghouse Electric & Mfg. Co. will build 54 at Eddystone, Pa., the General Electric Co. 25 at Erie, Pa., and the Altoona, Pa., shops of the Pennsylvania will furnish 11 of the locomotives. The orders, which total \$4,700,000, include driving wheels, axles, trucks, frames and cabs and the structural parts, in which the electrical apparatus recently purchased will be installed later.

The locomotive chassis built at Eddystone, Pa., will use the electrical equipment previously ordered from the Westinghouse company, while those constructed at Erie, Pa., and in the Altoona, Pa., shops of the railroad will have equipment ordered from the General Electric Co. Deliveries of the completed locomotives are scheduled to begin not later than December, and the entire consignment of 90 is expected to be ready by June, 1932.

Each locomotive will have a one-piece cast steel main frame, and the beds for those under order, and for the remaining locomotives in the present program of 230 units, or engines, will be made by the General Steel Castings Corp., at Eddystone, Pa. The passenger locomotives, known as Class P-5, are to be heavy duty, high speed, 52 ft. 8 in. in length and weigh 375,000 lb. This type has three pairs of 72-in. driving wheels and a 4-wheel engine truck at each end. Each of the three distinct units in these locomotives, the chassis, deck and cab, will be completely equipped before assembly into the complete engine.

It is planned to use two classes of electric passenger locomotives, the O-1 type and those just ordered, the P-5 type. In the past year, the railroad has had four of the O-1 type passenger locomotives on trains operating over the present electrified lines between Wilmington, Del., and Trenton, N. J.

American Railroad Co. of Porto Rico is inquiring for 100 all-steel sugar cane cars. N. L. Soto, San Juan, Porto Rico, is purchasing agent.

Northern Pacific is expected to come into the market for 500 underframes.

Fruit Growers Express has ordered 800 underframes from Pressed Steel Car Co.

North Western Refrigerator Line Co. has ordered 200 refrigerator cars from American Car & Foundry Co.

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Sixty-nine industrial trucks and tractors, all for domestic account, were shipped in May, against 71 in April, according to reports received by the Bureau of the Census from the 10 leading makers.

A.S.T.M. Holding Annual Meeting in Chicago

CHICAGO, June 23.—With a registration of 550 on the first day, exceeding that for any first day in the society's history, and with a large inflow today, the prospects are excellent for a very large attendance at the thirty-fourth annual meeting of the American Society for Testing Materials at the Hotel Stevens, June 22 to 26. Meeting usually each year at Atlantic City, N. J., but, following a plan to assemble in the West at least once in three or four years, this is the second meeting in accordance with that plan. In June, 1927, the convention was held at French Lick Springs, Ind.

A feature this year is the first exhibition of testing equipment ever held by the society. Some 30 booths are occupied with important displays in the exhibition hall of the hotel, many leading companies and research laboratories being represented. The exhibition is drawing marked attention.

Technically, the feature is a symposium on the effect of temperature on the properties of metal, the most elaborate and comprehensive in the metal industry ever held. Thirty papers are scheduled for this afternoon and evening sessions. Among symposiums during the week is one on malleable castings on Friday afternoon, June 26.

The usual committee meetings and reports, as well as many important technical papers, are events of each day's programs.

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Freight Rate Decisions

WASHINGTON, June 23.—Rates charged on iron and steel articles, in carloads, shipped since June 1, 1926, from Duluth and Steelton, Minn., and points on and east of the Mississippi River to points in Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota, Wyoming, Colorado and Texas were applicable, according to a decision of the Interstate Commerce Commission. The report ordered dismissal of complaints made against the rates. The rates were attacked by Albertson & Co., Inc., and numerous others. Reparation only was sought.

The shipments consisted chiefly of structural steel, sheet steel, bars and rods, wire and nails, bolts and nuts and agricultural implements. Charges on shipments from the Chicago, St. Louis and Peoria, Ill., districts and from other points west of the Indiana-Illinois line were collected on the basis of the fifth class rates, which in the absence of commodity rates apply on iron and steel products in Western territory. From points east of the Indiana-Illinois line, charges were collected on the basis of combination rates, composed of either class or com-

modity rates for hauls to the Mississippi River crossings, and of the proportional fifth class rates from the Mississippi River crossings to destinations. On shipments which received transit an additional charge of 2c. was made.

Existing rates on pig iron from points in Alabama and Tennessee to Indianapolis are not unreasonable, the Interstate Commerce Commission held in an opinion made public last Saturday. The rate from the Birmingham district is \$5.29 a gross ton. Complaint was made against the rates by the Federal Foundry Co., Indianapolis.

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Engineering Library Service Growing

On June 1 the main collection of the Engineering Societies Library, New York, comprised 141,546 books and pamphlets, according to Director Harrison W. Craver. During the calendar year the library was used by more than 40,000 engineers. The number of visitors during the first five months of 1931 was 12,255, while service was given to 18,726 members of the engineering profession. Several technical articles were translated and many orders for photoprints were received.

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May Foundry Equipment Orders Off Slightly

Foundry Equipment Manufacturers' Association reports a very slight decrease in orders in May, compared with April. The May index figure is 54.1, compared with 57.7 for April. This association uses as a base of 100 the average monthly shipments for 1922, 1923 and 1924.

The May index of three-months' average of gross orders is 95.4, a slight decline. May shipments of foundry equipment were almost double those of April. Unfilled orders for May, however, show a considerable decrease, the May index being 123.8, compared with 180.7 in April.

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Steel Barrel Production at 27 Per Cent

Productive capacity for making steel barrels was used during May to the extent of 27.3 per cent, according to reports of the Steel Barrel Manufacturers Institute, Cleveland. Production of I.C.C. barrels was 9.6 per cent of capacity, and of light barrels 35.9 per cent.

Total shipments during May were 339,795 units, and the business during the month is reported at \$757,676. Unfilled orders on June 1 called for 338,831 units, or practically the same as the output in May.

Advises Against "Short" Sales of Scrap

Dealers in iron and steel scrap are advised that this is no time to "go short" of the scrap market by Herman D. Moskowitz, of New York, president of the Institute of Scrap Iron and Steel. Mr. Moskowitz, addressing a meeting of the Chicago chapter of the scrap institute on June 17, said that conditions are set for a slow, sure return in the near future to new records of activity in the scrap industry. Scrap dealers were warned against making distress sales.

"The abnormal conditions of the times has prevented the placing of a real market value on scrap iron and steel today," declared Mr. Moskowitz. "There are too many scrap dealers who handle their tonnage as if it was all distress tonnage, and by their practices demoralize the stability of our commodity, helping neither the scrap business nor the steel industry in its efforts to stabilize its structure. The depression has caused sellers to throw caution to the winds in their efforts to do business.

"We must forget the bad experiences we have learned in this buyers' market and we must become, as we have been before, the sellers of our commodity and not order takers. There are indications of a business upturn in the near future, after the regular seasonal quietness, which we undergo in the steel business—a return which will be slow but sure, leading on to an unprecedented era in the scrap industry. In our adjustment to new conditions a cautious note of conservative operation must be sounded. We must be ready, alongside of other basic industries, to resist ruinous underselling. The volume of business, the return of which cannot be expected in leaps and bounds, but which will come in an orderly manner, will be sufficient for us all, if the purchases and sales will be made on lines of good merchandising practice."

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Lead Smelters to Be Closed for Summer

The American Smelting & Refining Co. has announced that it will close its lead smelters at Murray, Utah, and at East Helena, Mont., during July, August and September.

"The low price of lead has greatly curtailed mine production," said a statement of the company, "and correspondingly affected the tonnage coming to the smelters of the American Smelting & Refining Co. This shutdown will enable its labor to seek employment elsewhere during the summer and to return at the beginning of October, at which time the smelters will resume operations on a larger scale and afford steadier employment than would otherwise be possible."

More Welsh Tin Plate Mills Resume and Price Declines in Quiet Market

(By Cable)

LONDON, ENGLAND, June 22.

A SHARP improvement in sentiment has developed from President Hoover's proposals, stocks and certain commodity market prices advancing rapidly. Iron and steel prices, however, are unaffected and but little immediate change is expected.

Domestic pig iron consumers are covering only their immediate requirements and export demand is still small. Finished steel orders are limited to small tonnages, which only partly relieve the lack of tonnage on mill books and no improvement in general shipbuilding has developed.

The engineering trade has reached a provisional agreement, and the employers have withdrawn their ultimatum so that the settlement is expected to be ratified.

Preparations for resuming operation of tin plate mills lately in the pooling plan has released orders for Continental steel. Sheet bars have sold at £3 5s. (\$15.80) per ton and 2-in. billets at £3 2s. 6d. (\$15.19) per ton. The Continental market is otherwise quiet, with sellers increasingly reluctant to grant further concessions.

Tin plate is inactive and inquiry is slackening, so that mills have accepted down to 13s. 9d. (\$3.34) per base box.

Galvanized sheets are quiet and the price is a shade under £9 15s. (2.11c. per lb.), f.o.b., for a desirable order of No. 24 gage corrugated sheets in bundles. Black sheets are inactive with Far Eastern inquiry unimportant.

British plan renewal of operations at more tin plate mills and demand for Continental steel increases.

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Soviet steel purchases since beginning of year total 300,000 tons each in Poland and Germany.

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Japan makes aluminum foil 6/1000 in. thick and plans surplus for export.

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Germans to establish used machinery stocks in foreign markets to reduce surplus caused by recent modernization.

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Trade by barter grows as Poland accepts Yugoslavian tobacco for railroad cars and Germany considers Brazilian rice and South African grain for machinery.

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The British Mannesmann Tube Works, at Landore, has resumed operations. At the annual meeting of the Consett Iron Co., Clarence Smith, chairman of the board, emphasized the serious plight of industry as a result of the unprecedented collapse of demand. Continued decline, he said, should cause the Government the greatest concern for unemployment and national security. Wages, taxation and transport charges are much

heavier than those of our Continental competitors, he pointed out. Average wages of steel workers on the Continent half those paid here, he said, and in consequence it is not surprising that our iron and steel industry has difficulty in competing successfully in world markets. It is obvious that, unless wages and other costs of production are reduced, iron and steel must be protected from competition of foreign makers, more favorably placed.

The Continental Steel Cartel has been renewed provisionally until July 31, and a further meeting will be held in Paris, June 30. Prices of the International Rail Makers' Association are unchanged, and the next meeting will be in London in October.

The Indian Tariff Board has decided that no case has been established for removal of the pig iron duty, and considers that consumers will not suffer serious harm if the tariff is continued, pending a statutory inquiry in 1933.

Certain works in eastern France are not enthusiastic over the proposed French Merchant Bar Syndicate, and have not participated in the negotiations. To succeed, the syndicate must include an agreement with Saar and Belgian mills, which supply the French frontier consumers.

German output in May was 555,000 tons of pig iron, with 59 furnaces in blast at the end of the month.

Luxemburg output in May was 169,000 tons of pig iron, with 25 furnaces active, and 166,000 tons of raw steel.

The Soviet has bought 25,000 tons

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at \$4.8665 (par)

British Prices, f.o.b. United Kingdom Ports				Billets, Thomas (nominal) £3 2s. to £3 2½s. \$15.07 to \$15.19			
Ferromanganese, export.	£9 0s.		\$43.74	Wire rods, low C., No. 5	5 0	to 5 5½	24.30 to 25.64
Billets, open-hearth....	5 0	to 5 7½s.	24.30 to 26.12	B.W.G.	6 0		29.20
Black sheets, Japanese specifications	10 5		49.82	Rails, light	6 0		
Tin plate, per base box..	0 13¼	to 0 14¼	3.34 to 3.46	Black sheets, No. 31 gage, Japanese.....	11 5	to 12 12	54.68 to 58.32
			Cents a Lb.				Cents a Lb.
Steel bars, open-hearth..	7 17½	to 8 7½	1.71 to 1.81	Steel bars, merchant....	3 6	to 3 10	0.72 to 0.76
Beams, open-hearth....	7 7½	to 7 17½	1.60 to 1.71	Beams, Thomas, British standard (nominal)...	3 6	to 3 7	0.72 to 0.73
Channels, open-hearth....	7 12½	to 8 2½	1.66 to 1.76	Channels, Thomas, American sections	5 12	to 5 14	1.24 to 1.26
Angles, open-hearth....	7 7½	to 7 17½	1.60 to 1.71	Angles, Thomas, 4-in. and larger, over ¾-in. thick	3 7	to 3 8	0.73 to 0.74
Black sheets, No. 24 gage	8 10		1.84	Angles, Thomas, 3-in....	3 9	to 3 10	0.75 to 0.76
Galvanized sheets, No. 24 gage	9 15		2.11	Hoops and strip steel over 6-in. base.....	4 0	to 4 2½	0.87 to 0.89
Continental Prices, f.o.b. Antwerp or Hamburg				Wire, plain, No. 8 gage..	5 0		1.09
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2 6s.	to £2 7s.	\$11.19 to \$11.42	Wire, barbed, 4-pt. No. 12 B.W.G.	8 15		1.89

of Polish steel sheets and 2000 tons of dynamo sheets, making total allocations to Poland this year of 300,000 tons.

Russian output in 1930 was 10,600,000 tons of iron ore, 5,010,000 tons of pig iron and 5,690,000 tons of raw steel. May output of pig iron was 314,000 tons, which is 72 per cent of the program. Raw steel output was 273,000 tons, or 70 per cent of the program.

Soviet steel orders placed in Germany mentioned in last week's cable have now been increased to 300,000 tons.

A party of 40 Italian industrialists, under Prof. Felice Guarnari of the Fascist Confederation of Industries, will visit the Soviet Union. The party includes representatives of Ansaldo and Pirelli.

Japanese Company Makes Aluminum Foil

YOKOHAMA, JAPAN, May 20.—In June or early July, the Sumitomo Aluminum Co. is planning to make its first offers of aluminum foil, following a long period of tests of the new product. The foil will be furnished in sizes down to 6/1000 in. thick, and in addition to a substantial supply for the Japanese market the company expects to have a surplus for export to India and other Far Eastern markets.

Japan's Pig Iron Stocks Total 492,882 Tons

YOKOHAMA, JAPAN, May 20.—Stocks of pig iron in Japan on March 31 had decreased 1285 tons from the total held at the end of February, according to the Mitsubishi Shoji Kaisha, one of the large trading companies. Of a total of 492,882 tons in stock, 12,322 tons was foreign pig iron and the rest of domestic make.

Japan Builds German Diesel Engines

HAMBURG, GERMANY, June 10.—Certain Japanese machinery builders are operating under licenses from German companies. Among the important licensees are the Mitsubishi Co., Kobe Steel Works and Harima Dock & Ship Yard Co., which are licensed for manufacture of Diesel engines by the Gebr. Sulzer A. G. All three companies are building engines for marine use, the Kobe and Harima companies making engines for the Imperial Navy. The Kawasaki Dockyard Co. at Kobe and the Yokohama Dockyard Co. are licensed by the M.A.N. works at Augs-

burg for manufacture of Diesel engines. Despite this substantial production of Diesel motors in Japan, however, German makers have been able to close some business recently. It is claimed that, with the exception of the engines furnished to the Imperial Navy, the quality does not compare favorably with the German-made product and the price is high.

Tin Plate Agreement Discussed in Europe

DÜSSELDORF, GERMANY, June 10.—Negotiations have been started for a tin plate export agreement, with British, French and German makers participating. Cooperation of American tin plate producers with the European industry is not mentioned. A proposal is being considered which would distribute foreign markets, giving the French colonies entirely to French tin plate makers, allotting certain markets to Germany and giving most of the remaining world markets to British producers, who would also be granted a certain export allotment to Germany. Recent failure of the Welsh Tin Plate Association is expected to hamper these negotiations.

Japan Offers Pig Iron to European Users

HAMBURG, GERMANY, June 10.—As part of an effort to reduce a heavy surplus of pig iron stocks, Japanese sellers are offering certain grades to European consumers at attractive prices. Purchase of some fair-sized tonnages is expected. This is the first time Japan has made an effort to sell pig iron to Continental users.

Trade by Barter Is Growing in Europe

BERLIN, GERMANY, June 8.—Foreign trade by exchange of products appears to be increasing among European producers. The Polish Railroad Car Makers Cartel has entered into a preliminary agreement with Jugoslavia for delivery of \$1,100,000 worth of railroad cars in exchange for tobacco in the warehouses of the Jugoslavian Government. Other European car builders are somewhat concerned that this may be the first of many such agreements. Meanwhile German machinery manufacturers are considering proposals of overseas markets for exchange of agricultural products for industrial equipment. A specific instance is a proposal under consideration to exchange Brazilian rice and South African grain for German machinery.

Germany to Stock Used Machinery Abroad

HAMBURG, GERMANY, June 10.—Increased export of used machinery is planned by various machinery associations to reduce the available supply, which has been accumulating in the past few years as a result of widespread modernization of equipment by German plants. The used equipment, which consists mainly of machine tools and power plant machinery, could be disposed of in the domestic market only at greatly reduced prices. In consequence, plans are being made to ship such machines to stocks in Buenos Aires, Argentina, as a distribution center for South American markets, and to Kobe, Japan, for Far Eastern markets. It is believed that maintenance of such stocks close to the consuming markets will greatly aid in selling.

Estonian Car Shop Is Bought By Germans

BERLIN, GERMANY, June 8.—A group of German railroad car builders, known as Dwigatel A. G., has purchased the only car building shop in Estonia. The new company plans to build railroad cars at this plant for the Baltic countries, especially the Soviet Union, which has the same gage railroads as Estonia.

World Wire Makers Are to Meet in Germany

HAMBURG, GERMANY, June 10.—Representatives of leading manufacturers of wire in various countries, including the United States, will meet shortly in Germany with representatives of the German wire industry. It is suggested among German wire makers that the meeting will discuss present conditions of competition in foreign markets.

Parcel Post Used for Exports of Steel

WASHINGTON, June 23.—Iron and steel manufactures to the value of \$499,751 were exported by parcel post last year compared with \$699,590 in the preceding year, according to the Department of Commerce. Parcel post exports of electrical machinery and apparatus were valued at \$412,175, as against \$402,918. Total parcel post shipments of American merchandise to foreign markets during 1930 in packages valued at \$25 and over aggregated \$20,510,033, compared with \$26,656,088 in 1929.



BOOK REVIEWS



Ingenious Mechanisms

Ingenious Mechanisms for Designers and Inventors.
Edited by Franklin D. Jones. Pages 536, 6 x 9 in.
Published by the Industrial Press, 140 Lafayette Street,
New York. Price, \$5.

THIS interesting book represents the contributions of 110 experienced designers and engineers throughout the world. The standard and special mechanisms described and illustrated were chosen from material collected over a period of more than 15 years and include those resulting from the prize competitions conducted by *Machinery*, as well as the best of the material from this publisher's previous treatise on "Mechanisms and Mechanical Movements." Of concrete importance is the fact that the mechanisms described were selected not only because of their ingenuity, but because they have stood the test of actual practice.

Mechanisms are grouped into some 20 chapters according to general types. This grouping, together with the complete index, facilitates reference; furthermore, in bringing together mechanisms that are alike as to function but that differ in design, this arrangement permits making ready comparisons. The more than 300 line engravings used throughout the book are of good size and are placed with the text they illustrate.

In addition to chapters on cams, intermittent motions and others that one would expect in such a treatise, the chapters on electrical tripping mechanisms, hydraulic transmissions for machine tools, hopper design, magazine feeding attachments and the design of magazine carriers and slides may be mentioned to indicate the up-to-date-ness as well as the comprehensiveness of this volume.

The editors and publishers are to be congratulated for making available to designers, engineers and students of designing practice such an assemblage of data, so well presented.

Materials of Engineering

Textbook of the Materials of Engineering. By Herbert F. Moore. Fourth edition. 409 pages, 6 x 9 in., illustrated. Published by the McGraw-Hill Book Co., New York. Price, \$4.

THIS textbook by an eminent authority sets forth the physical properties of materials commonly used in structures and machines, together with brief descriptions of their manufacture and fabrication. It embodies a number of changes and additions. The one chapter on failure under repeated stress has been replaced by three chapters on elastic failure, failure by "creep" and failure by fracture. The chapters on the manufacture of iron and steel have been consolidated, as well as those on castings and on rolled and forged steel. A new chapter on the crystalline structure of metals has been contributed by Prof. J. O. Draffin of the University of Illinois. Recent types of testing machines have been added to the section on inspection and testing, and the chapter on specifications has been entirely rewritten. Values for strength, ductility and other properties have been revised.

Although intended primarily for technical schools, this book has considerable value for draftsmen, machin-

ists and others who deal with iron and steel and other materials in their daily work. For those desiring to go into further details, selected references are available at the end of each chapter.

The Early Virginian Iron Industry

Virginia Iron Manufacture in the Slave Era. By Kathleen Bruce, Ph.D. Century Co., New York. Publications of the American Historical Association.

IN this book Dr. Bruce has added a great deal to our knowledge of the industrial history of Virginia. She has successfully accomplished her objective to "set the Virginia iron industry not only in an economic but, to some degree, in a political and social background," and has done so in an interesting and illuminating manner. The period covered is from the time of the ill-fated attempt of the London Co. to build iron works on Falling Creek down to the close of the Civil War.

The early period of the Virginia iron industry, which did not really begin until the first part of the eighteenth century, is briefly traced. It is interesting to note that the Washingtons, Taylors and other Virginian families which became prominent were connected with the early iron industry, Thomas Jefferson even owning a nail works operated by his slaves. The influence of the Revolution on the colonial industry, the development of the Virginia coal trade, and a brief description of industries in general before 1840 form the background for the main part of the book, which deals with the rise and progress of the Tredegar Iron Works, of Richmond, down to 1865.

Dr. Bruce has made a very careful and detailed study of the manuscripts of the Tredegar works from its beginning in 1838 to the end of the Civil War. The history of this works, the largest south of the Potomac before the war, is well presented. The character study of Joseph Reid Anderson, "Master of the Tredegar," is colorfully portrayed. Certain incidents, such as the strike of 1847, when white puddlers and rollers objected to hired slaves filling the same positions that they held, the torch-light procession to celebrate the first birthday of the Tredegar locomotive shops, the rolling of the plates for the *Merrimac*, the re-casting of the great shaft for the *Mississippi*, the production of cannon for the Federal Government before the war and of cannon and other ordnance material for the Confederacy during the war, and the life of the hired negro slave workers are vividly described, in many cases with dramatic touches.

In spite of the general opinion that negro slaves could be used successfully only on plantations, Dr. Bruce clearly brings out the fact that in Virginia they were used profitably as factory hands. During the colonial period and after, negro slaves were used as skilled workers in iron works, not only in Virginia, but also in such Northern States as Pennsylvania and New Jersey. By the middle of the nineteenth century they were employed as puddlers and rollers in the works at Richmond.

The Tredegar works and other iron works at Richmond played an important part in the life of the Confederacy. But it should be borne in mind, as suggested in this study, that there were many iron works scattered over the South and that the works of Alabama and Georgia

furnished much ordnance for the South in the great struggle.

J. P. Lesley's *Iron Manufacturer's Guide*, although incomplete and inaccurate to a great degree, has been used in connection with the discussion of some of the iron works. The bibliography, however, is good. The book contains a few interesting pictures, copious notes, appendices, and an adequate index. The work, as the author states in the preface, is a "pioneer in an unexploited field." It is not a technical study, but a well-written historical account of the Virginian iron industry to 1865, with an emphasis on the Tredegar Iron Works. All this deserves to be better known. The book is a valuable contribution to American economic history.

ARTHUR C. BINING.

Electric Welding

Electric Arc Welding. Published by the Hobart Brothers Co., Troy, Ohio. Pages 76, 4 x 7 1/4 in. Price, \$1.

IN presenting essential data devoid as much as possible of highly technical and theoretical discussion, this small volume should be of value to those men in a wide range of industries who, with little or no technical training in the welding field, have become interested in the successful application of the electric arc process. The material is briefly but logically presented and includes useful information and suggestions derived from practical experience.

Chapter headings are: The welding arc; welding equipment; types of joints and welds; weldability of metals; choice of electrodes; using the metallic arc; using the carbon arc; and the speed and cost of welding. Operating instructions for Hobart "Constant Arc" welders are included and several pages are devoted to examples of arc welding in general repair and factory work and in construction fields. An alphabetical index facilitates reference.

Steel Patents Indexed

Index to Iron and Steel Plants. By V. Everett Kinsey and Thomas E. Hopkins. American Compilation Co., Pittsburgh, 1930. Pages, 349, 6 x 9. Price, \$25.

PROVIDING a brief and concise outline of the technical progress of the iron and steel industry in the United States, this book is a much needed addition to the reference literature of the subject. The aims of the authors, as set forth in the preface, are the collection of all patent material in one field under one cover, an arrangement of the data to be easily accessible, and presentation of the subject matter in such a manner that the essentials of the patents are comprehensible at a glance. In fulfillment of the latter aim, the authors have been unusually successful. Each patent is numbered, dated and identified as to the owner and assignee. Following in the order named are the subject, the object, the method, the analysis and the resultant product.

The patents are listed chronologically in inverse order; that is, most recent patents are listed first, and at the end of the index is found the patent granted to Christian Shunk on Feb. 10, 1863, the object of which was "to refine iron by blasts of air." In looking through the list it is interesting to note that a patent was granted to George H. Smith on Aug. 14, 1866, on making steel direct from ore. Needless to say, only a comparatively small number of the patents granted have been entirely successful in practice.

The index of the book, which is divided into six parts, lists alphabetically the patentees, assignees, types of iron

and steel covered, alloying constituents included, suggested uses of patents and classifications as designated by the patent office. Following the index are a glossary defining the terms used in describing the patents and a list of the chemical symbols used with their equivalents.

All patents relating to the metallurgical methods for the manufacture of iron and steel and iron and steel alloys are included in the index. Both claims and specifications of the patents have been thoroughly examined and concise briefs prepared. Alloy patents in which the iron content is 5 per cent or above have been included.

Leather Belting Data

Treatise on Leather Belting. By George B. Haven and George W. Swett; 249 pages, 5 x 8 in.; illustrations and charts, 77; tables, 25. Published by the American Leather Belting Association, New York. Price, \$1.50.

COMMISSIONED by the Leather Belting Association, the authors of this treatise, both professors of machine design at Massachusetts Institute of Technology, Cambridge, Mass., have produced a valuable reference work for those interested in mechanical transmission of power.

The book describes all stages in the manufacture of leather belting, as well as details of the processes involved in making belting from the finished leathers. Other chapters deal with the commercial grades and weights of belting most suitable for various types of drives, proper installation and care of belting. Four chapters are devoted to belt drive engineering methods; these include mathematical tables and original nomograph charts especially developed for belting problems. The mathematical material has been simplified, however, to the range of accuracy found in the usual data of mill engineering practice.

In addition to presenting comprehensive engineering and maintenance data, the book describes tests and includes sample specifications and other information for purchasing agents. It should prove of value not only to mill engineers, but also to engineering students. The volume is bound in stiff covers and is thumb indexed for section reference.

Blue Book of Southern Progress

A STATISTICAL book recording the progress of the South has been put out by *Manufacturers' Record*, Baltimore, as the 1931 Blue Book of Southern Progress. This is a volume of 226 pages, of which 182 pages form the text. It is illustrated, but consists for the most part of tabular matter, with enough descriptive text to explain the tables.

It is reported that 1930 set a new high record in the amount of money invested in Southern construction and engineering projects. Construction contracts awarded in the 16 States covered aggregated \$921,000,000.

Continued expansion is noted in the Southern iron and steel industry. Among the principal expenditures in this expansion are reported \$20,000,000 by the Gulf States Steel Co., \$10,000,000 by the Weirton Steel Co., and \$8,000,000 by Tennessee Coal, Iron & Railroad Co.

Development of power in the South reached 21,082,000,000 kwhr. in 1930, which was within 2.3 per cent of the peak, reached in 1929. It is said that the South has been expanding its public utility power facilities about twice as fast as the rest of the country.

▲▲NEW TRADE PUBLICATIONS▲▲

Electric Annealing Furnace.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A four-page illustrated leaflet describes the company's bell type annealing furnace for which certain desirable advantages are claimed, particularly low cost.

Heating Units.—Harold E. Trent Co., Philadelphia. A four-page illustrated leaflet describes the Trent electric strip heating units which are applicable to certain types of electrical heating equipment.

Heat-Treating Furnace.—W. S. Rockwell Co., New York. Leaflet No. 312 describes a continuous heating furnace of the sectional conveyor type, adaptable for annealing, hardening, tempering, normalizing, etc., with either electricity or the usual fuels.

Electric Pot Furnaces.—Ryan, Scully & Co., Philadelphia. A four-page illustrated leaflet, published as Bulletin No. 9, describes electric pot type furnaces, round and rectangular, produced by this company. They are described as of rugged construction, demanding a close accuracy of heat penetration and an entire elimination of scale.

Thermometal.—H. A. Wilson Co., Newark, N. J. A 16-page pamphlet describes various types of thermometal made under the trade name of Wilco by this company. Illustrations show the types of products and charts giving some of the results of their use.

Steel Castings.—Detroit Steel Casting Co., Detroit. An elaborate 24-page pamphlet is offered as a picture presentation of the laboratory of this company. It contains many photographs of various departments of the foundry as well as the laboratory, and pictures of some of the company's products with considerable text describing the regular and alloy castings produced.

Alloy Steel.—Darwin & Milner, Inc., Cleveland. A small, 12-page booklet describes this company's patented air-hardening cobalt-chromium steel, known as "Cobalterom PRK 33." Besides a general description of this material, there is a chart showing the physical properties under various conditions. There are also photomicrographs of various stages of heat treatment.

Pyrometers.—Brown Instrument Co., Philadelphia. A four-page folder, fully illustrated, printed in blue, silver and black, describes a new potentiometer pyrometer. The illustrations show nine of the 50 novel features claimed for instrument.

X-Rays.—Claud S. Gordon Co., 708 West Madison Street, Chicago. A four-page folder, entitled "Secrets of Metal," describes some of the services which the X-ray laboratories of this company are prepared to offer to various lines of industry.

Tantalum.—Fansteel Products Co., Inc., North Chicago, Ill. A six-page folder, entitled "Tantalum in the Process Industries," describes some of the possibilities and growing uses of this metal in the industrial field. It emphasizes the company's electro-fabricated tantalum.

Charging Machines.—Wellman Engineering Co., Cleveland. Bulletin No.

94, 16 pages, describes open-hearth charging machines, giving constructional details of important members. Various improvements have been made in the design providing a more massive construction, greater rigidity, more draw-bar pull capacity, higher speeds, more effective lubrication and general efficiency, as well as increased safety in operation.

Aluminum Welding.—Aluminum Co. of America, Pittsburgh. A 9 x 12-in. wall card gives brief instructions for welding aluminum by torch, metallic-arc and carbon-arc processes. More detailed information is contained in a separate technical booklet.

Power Saws.—Racine Tool & Machine Co., Racine, Wis. Illustrated folder describing Shear Cut production saws, hydraulically controlled by pressure from the Racine Oilmotor.

Springs.—Barnes-Gibson-Raymond, Inc., 6400 Miller Avenue, Detroit. Attractively illustrated, 56-page loose-leaf catalog of engineering data, tables and formula on springs. Separate sections are devoted to wire springs and forms, flat springs and stampings, and die springs. The growth of the company and its manufacturing processes are described in another section.

Packing.—Garlock Packing Co., Palmyra, N. Y. Folder describing patented Chevron packing for heavy-duty hydraulic equipment. This packing is furnished in sets including a number of rings of V-shaped cross-section and top and bottom adapter rings conforming respectively to the bevel of the gland and stuffing box.

Crane Bridge-Stop Control.—Electric Controller & Mfg. Co., Cleveland. Folder illustrates automatic dynamic braking equipment for controlling the speed of crane bridge drives and preventing the crane from over-riding the runways.

Conveyor Belts.—Diamond Rubber Co., Akron, Ohio. A 40-page booklet on belt practice containing illustrations, technical descriptions, tables of capacities and other data on the selection, operation and maintenance of conveyor and elevator belts.

Belts.—Link-Belt Co., Chicago. Sheet No. 2 of a series of material-handling and power transmission data sheets covers informative data on belt conveyor horsepower and stress.

Barrows.—Jackson Mfg. Co., Harrisburg, Pa. Illustrated 36-page catalog, showing various types and specifications of pressed steel barrows, drag scrapers, concrete carts, etc.

Heaters.—Drying Systems, Inc., 1800 Foster Avenue, Chicago. Bulletin No. 201 describes the "Dry-Sys" Type "L" Air Heater, indirect, gas-fired, with list of its applications to heating and drying problems.

Tramrails.—Cleveland Electric Tram-rail Division, Cleveland Crane & Engineering Co., Wickliffe, Ohio. Illustrated folders, devoted to overhead systems for movement of materials, describing the application of this equipment to the metal-working and automotive industries.

Steel Castings.—Alloy Cast Steel Co., Marion, Ohio. Catalog, 36 pages. This

lists castings made by this company of nickel, nickel-chrome, manganese, molybdenum, nickel-chrome-molybdenum, medium and high-manganese, vanadium and plain carbon steel. Brief descriptions of various alloys are given, together with tables showing their analyses and physical properties. There are also tables of analyses of various grades listed according to S.A.E. numbers. Illustrations show types of castings made of the different alloys.

Asphalt Paint.—American Asphalt Paint Co., Chicago. An elaborately illustrated 52-page, paper-bound book on the subject of water and Valdura asphalt paint.

Thermostats.—Robertshaw Thermostat Co., Youngwood, Pa. Insert price list and capacity rating sheet, covering various types of industrial thermostats.

Magnetic Clutches.—Cutler-Hammer, Inc., Milwaukee. A 24-page illustrated booklet, entitled "Keeping Pace with Machine Design," deals with the features and adaptabilities of magnetic clutches. Clutch controllers and other equipment are also catalogued.

Stokers.—Combustion Engineering Corp., 200 Madison Avenue, New York. Illustrated leaflet outlines outstanding features of a C-E stoker unit.

Pumps.—Worthington Pump & Machinery Corp., Harrison, N. J. Catalog, 31 pages, with illustrations and diagrams, covering pumps for deep well, sump and irrigation service. Average velocity, equivalents and theoretical horsepower requirements are covered in tables.

Hangars.—Thompson Electric Co., 1438 West Ninth Street, Cleveland. Illustrated folder, showing new method of installing overhead light equipment through use of safety lowering hangers.

Heat-Transfer Apparatus.—Griscorn-Russell Co., New York. Illustrated bulletin covers various types of condensers, coolers, heat exchangers, heaters and evaporators.

Electrical Tester.—P. E. Chapman Electrical Works, St. Louis. Illustrated four-page leaflet describing an internal growler adaptable for use in testing for short circuits in electric motors.

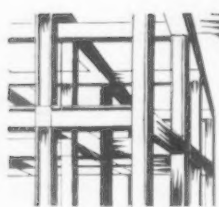
Flasher.—Reynolds Electric Co., New York. Bulletin No. 49, illustrated, describes the CMO flasher for electric signs, the latest addition to the Reco flasher group. Bulletin also illustrates color hoods.

Meters.—Brown Instrument Co., Philadelphia. A 32-page catalog, illustrated, describes the Brown electric CO₂ meters for use in connection with furnace operation. It is claimed that these meters combine convenience, accuracy and freedom from maintenance difficulties.

Set Screws.—Shakeproof Lock Washer Co., 2501 North Keeler Avenue, Chicago. Folder presents principles and advantages of Shakeproof self-lock set screws.

Steam Purifiers and Oil Separators.—Schutte & Koerting Co., Philadelphia. Bulletin No. 9 gives information respecting construction, operation, etc., of steam purifiers and oil separators.

Electric Control Apparatus.—Allen-Bradley Co., Milwaukee. A series of new bulletin and price sheet inserts, descriptive of controlling apparatus.



PLANT EXPANSION AND EQUIPMENT BUYING



Machine Tool Dullness More Pronounced

June Business May Fall Below That of May—Slow Summer Seems Probable

WITH machine tool buyers awaiting definite signs of a general business upturn, the machine tool markets of the country have lapsed into a state of dullness that is perhaps more pronounced than at any time during the depression.

It seems likely that the aggregate of June orders will fall below that of May. The sales curve, as charted by

the National Machine Tool Builders' Association, has been downward since March, with nothing yet in sight to indicate when a reversal of the trend will come.

If general business shows an early autumn recovery, some improvement in machine tool sales may be expected to develop at about the same time. This would be somewhat unusual, be-

cause machine tool business frequently lags behind other lines in an upward trend, but the period of the depression has been so long and so much has been done toward educating manufacturers as to the value of adopting more economical production methods that any move that will help to restore confidence may be felt more quickly than usual in machine tool sales.



NEW YORK

Developments of interest are lacking in the machine tool market. The situation has changed very little, if at all, during the past several weeks. Machine tool dealers are, of course, obtaining occasional orders, mostly for single tools, but the general character of the demand is lifeless. June business will make a poor showing, perhaps not much worse than that of May, but certainly no better.

CHICAGO

The machine tool market is sluggish. Inquiries are probably a trifle more numerous, but do not carry an atmosphere of urgency or real need. Quotations to the Chicago Board of Education and State of Illinois are dormant, and the list of the Milwaukee Road, after first having been trimmed rather closely, has now been set aside for an indefinite period. The Chicago & North Western is inquiring for a 25-in. drill press and a few items still remain open on the Santa Fe list. Forced sales of used machine tool equipment are more common and the second-hand tool market is better supplied than for many months.

PITTSBURGH

Little of importance has developed in the machinery market the past week, and business is quieter than at any time since last December. The Westinghouse Electric & Mfg. Co., East Pittsburgh, has placed a few tools in addition to those required for its electric locomotive work. No new inquiry is reported.

Machinery dealers are of the opinion that the prospective increase in railroad freight rates will develop some business from the carriers later in the year. Thus far there has been practically no buying from this important consuming industry.

MILWAUKEE

A slight improvement is discernible in the machine tool market, but the volume of new orders remains sharply restricted to purchases for urgent needs. Few sales are reported other than for replacement, although builders of high-speed milling machines say interest in such equipment is becoming greater. While the trade does not look for any marked rise in the sales curve in July and August, sentiment is becoming somewhat more optimistic. June business was about average, some shops reporting as good a month as any this year, while others experienced the lowest point of the first half.

CLEVELAND

The machinery market continues to drag, with sales limited to a few tools. The volume of business in June is expected to be below that in May. There is very little new inquiry. Users of machinery, as a rule, are not inclined to buy any tools unless urgently needed. Considerable interest in steel plant equipment was shown in the exhibit held in connection with the convention of the Association of Iron and Steel Electrical Engineers in Cleveland last week.

CINCINNATI

The slight increase in lathe demand, recently noted, has receded and the machine tool market has again lapsed into dullness. Inquiry also has slackened.

NEW ENGLAND

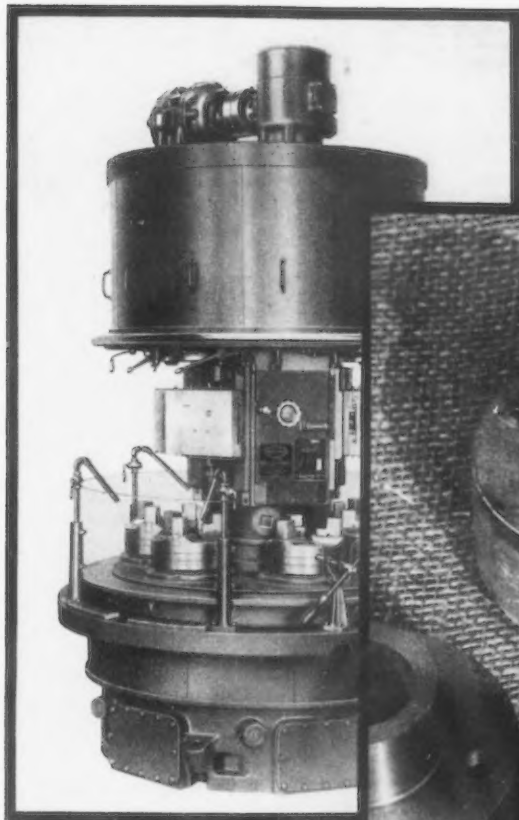
Some machine tool users are operating on a larger scale than a month ago, but with others production has slackened. All express confidence in the future, however, but are not disposed to commit themselves on machine tools until business improvement is more definite. Aside from those engaged on export work, machine tool builders in this territory are doing less than a month ago. One northern New England maker is working on a \$250,000 export order, and central Massachusetts and a few Connecticut firms have taken orders for Russian delivery.



New York

PLANS are under way by American Locomotive Co., 30 Church Street, New York, for an expansion and modernization program at Schenectady plant, including pipe shop and other units, to cost over \$200,000 with equipment.

Village Council, Pelham Manor, N. Y., plans installation of incinerating equipment, mechanical-handling and other machinery in proposed garbage and refuse disposal plant at Good Place and West Street, where site has been acquired, to cost over \$100,000 with equipment.



BULLARD
production units
may be purchased on
deferred payment plan



The Bullard Company

Bridgeport
Connecticut

Mult-Au-Matics provide a universally adaptable method of machining chucked work by simultaneously performing a variety of multiple operations at the individual rates of speed and feed most suitable to the economical performance of each operation, yet harmoniously balanced for the most efficient production of the completed job.

United States Rubber Co., Broadway and Fifty-eighth Street, New York, has leased five-story building at 240 West Sixtieth Street, for a new factory branch, storage and distributing plant.

Superintendent of Lighthouses, Staten Island, N. Y., is asking bids until July 7 for three 13-in. precision-gear head lathes and one 20-in. similar type lathe, both motor driven.

Rand Rubber Co., 397 Sumner Avenue, Brooklyn, manufacturer of special rubber products, has plans for a three-story addition, including improvements in present factory, to cost over \$70,000 with equipment. Michl Marlo, 200 Beverly Road, Brooklyn, is architect.

Power equipment, motors, conveying and other machinery will be installed by Yonkers Statesman Corp., Yonkers, N. Y., in new multi-story newspaper printing and publishing plant on Larkin Plaza, for which general contract has been let to Fred T. Ley & Co., 578 Madison Avenue, New York, to cost over \$175,000 with equipment. J. Y. Rippen, Yonkers, is architect.

Electric Valve Mfg. Co., New York, has been organized with capital of \$50,000 to take over and expand company of same name with headquarters at 68 Murray Street, manufacturer of special valves and kindred engineering specialties. Walter J. Corcoran and Rudolphe G. Laurence head new company.

Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, C. C. Hubbell, purchasing agent, will receive bids until July 3 for quantities of wrought steel pipe and locomotive boiler tubes.

Stainless Electro Plating Co., 67 Spring Street, New York, has leased floor in building at 71 Spring Street, for expansion.

New York Edison Co., 4 Irving Place, New York, is installing new condensers and other equipment in its Hell Gate power station. Expansion will be carried out in connection with new steel tower transmission line to connect with system of Niagara-Hudson Power Corp., Electric Building, Buffalo, in Westchester County. Last noted utility company plans erection of power substation at North Troy, N. Y., to cost more than \$200,000.

Circle Flexible Conduit Co., 24 Woodward Avenue, Maspeth, L. I., has plans for one-story addition, 55 x 100 ft., to cost close to \$45,000 with equipment. Saul Goldsmith, 4914 Church Avenue, Brooklyn, is architect.

George Ferrara, New York, tool manufacturer, has leased space in building at 61 Beekman Street for establishment of a new shop.

Harry C. Harper, Hackensack, N. J., former sheriff, and associates are negotiating for purchase of local plant, for price of about \$300,000 and will remodel for new freight terminal with installation of elevating, conveying and other mechanical handling equipment. A company will be organized to carry out project.

Following recent acquisition of Eastern New Jersey Power Co., Asbury Park, N. J., by Jersey Central Power & Light Co., same place, last noted utility will issue bonds in amount of \$32,000,000 and preferred and common stock totalling \$12,747,200, parts of proceeds to be used for purchase of Eastern company and for extensions and improvements, including transmission lines. Purchasing company is operated by National Public Service Corp., 57 William Street, New York.

Armory Board, Trenton, N. J., plans installation of a machine shop in new two-

unit armory at Jersey City, N. J., to cost over \$500,000. Hugh A. Kelly, 921 Bergen Avenue, Jersey City, and J. Osborne Hunt, Hanover Street, Trenton, are architects in charge.

Mack International Motor Truck Corp., Plainfield, N. J., operated by Mack Trucks, Inc., 25 Broadway, New York, manufacturer of motor trucks and parts, is arranging for a new assembling plant at Toronto, to be operated by Mack Trucks of Canada, Ltd., a subsidiary, to cost close to \$100,000 with equipment. A. V. Harburn is general manager of Canadian organization, Toronto.

Bids are being asked by a joint committee representing a number of municipalities in northern New Jersey, Edward S. Rankin, City Hall, Newark, secretary, until July 16, for equipment for a joint sewage treatment plant at Elizabeth, with settling tank capacity of 50,000,000 gal. a day, including pumping machinery, air compressors, traveling cranes, valves, sluice gates, ejectors, meters, sludge storage works and other superstructures. Different municipalities interested include Newark, East Orange, West Crange, Roselle Park, Summit and several townships. Alexander Potter, 50 Church Street, New York, is chief engineer.

South Atlantic

BUILDING at 425-27 Grindall Street, Baltimore, has been leased by Smith & Monson Co., Baltimore, for manufacture of soda fountain equipment and supplies.

Board of District Commissioners, District Building, Washington, will receive bids until June 30 for quantity of steel fabric reinforcing wire.

Greensboro Loom Reed Co., Greensboro, N. C., manufacturer of textile looms and other textile mill equipment, has taken over property at Charlotte, N. C., formerly occupied by Jacobs Mfg. Co., for a new branch plant.

Constructing Quartermaster, Fort Oglethorpe, Ga., is asking bids until July 7 for four steam-jacketed boilers with accessories.

Brown Guano Co., Albany, Ga., is planning rebuilding of part of commercial fertilizer manufacturing plant recently destroyed by fire, with loss estimated over \$200,000 including equipment.

General Purchasing Officer, Panama Canal, Washington, is asking bids until July 6 for one gasoline engine-driven ditcher, 87,500 ft. telephone distribution cable and other equipment. Bids will be asked soon, closing about Sept. 1, for construction of Madden Dam project in Canal Zone, including power plant and appurtenant works.

Key City Furniture Co., B Street, North Wilkesboro, N. C., has awarded general contract to Pardue Brothers, Moravian Falls, N. C., for two-story addition, 50 x 140 ft., to cost close to \$35,000 with equipment. Company is planning purchase of a motor-driven, double-spindle boring machine and other equipment.

Board of Trustees, Agnes Scott College, Decatur, Ga., has arranged a fund of \$125,000 for new power plant and mechanical laundry. Dr. J. R. McCain is president.

Board of Awards, Office of City Register, City Hall, Baltimore, will receive bids until July 1 for 10,070 tin license plates, 30,000 German silver dog license tags.

2100 metal vendor badges, 10,000 aluminum franchise tags, 3500 octagon-shaped aluminum tags, 250 German silver kennel tags.

Bids will be opened July 2 by Bureau of Supplies and Accounts, Navy Department, for an 8-ft. arm radial drill press and a multiple-spindle drill machine, both motor driven, for Brooklyn Navy Yard.

Buffalo

CONTRACT has been let by Federal Mill, Inc., Lohrman Building, Buffalo, to Jones-Hettelsater Construction Co., Mutual Building, Kansas City, Mo., for addition to flour mill, to cost close to \$90,000, with processing, elevating, conveying and other equipment.

A. F. Oliver Gear & Machine Co., Inc., 60 Cherry Street, Buffalo, has plans for a one-story factory, 85 x 250 ft., to cost over \$75,000 with equipment. Edward B. Green & Son, and Albert H. Hopkins, 1 Niagara Square, are architects.

Aaron Vandecer, 110 Teall Avenue, Syracuse, N. Y., and associates have organized Kal-Van Corp., and plan operation of local factory for manufacture of vending machines and parts. James Schrilla, Broad Street, Oneida, N. Y., is interested in company.

Perfection Canning Co., Newark, N. Y., is arranging for expansion at fruit canning plant, with installation of equipment to more than double present capacity. Company will increase capital to \$200,000 to provide funds for work.

Snow White Co., Oswego, N. Y., has leased local mill of Oswego Yarn Mills, Inc., with option to purchase, for production of paper pulp under a special process. William J. Dial will be superintendent at plant.

Standard Natural Gas Co., Dundee, N. Y., care of Michael Murphy, Ellicottville, N. Y., president, recently organized by Mr. Murphy and associates with capital of \$200,000, has taken over natural gas properties of Claude W. Foster in Dundee-Wayne gas field, totaling about 1000 acres, and plans development program, including pipe lines, booster station facilities, etc. Company will also operate natural gas properties near Nelsonville, Ohio, where about 5000 acres has been secured from Foster interests.

Robeson-Rochester Corp., Perry, N. Y., has advanced production from three to five days a week at local cutlery manufacturing plant. Franklin Automobile Co., Syracuse, N. Y., has resumed production with a normal working force of 1800 persons, following curtailment for two weeks.

New England

PROPERTY at Jamaica Plain, Boston, has been purchased by Boston Consolidated Gas Co., 100 Arlington Street, Boston, for new five-story equipment storage and distributing plant, with service and repair departments, meter testing and other mechanical divisions, to cost over \$200,000 with equipment. An automobile service, repair and garage building will be included.

Taunton Pearl Works, Inc., 35 Vernon Street, Taunton, Mass., has asked bids on general contract for a two-story and

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basement addition to cost about \$45,000 with equipment. Jackson & Moreland, 31 St. James Avenue, Boston, are architects.

Board of Selectmen, Weston, Mass., plans installation of manual training equipment in new high school, to cost about \$150,000, for which bids have been asked on general contract. Ralph H. Doane, 60 Batterymarch Street, Boston, is architect.

Borst-Foster-Dixfield Co., Dixfield, Me., manufacturer of wood novelties, etc., has plans for a new factory at West Peru, Me., 60 x 110 ft., with power house, pumping plant and other units, to cost over \$65,000 with equipment. H. F. Hallock, Oswego, N. Y., is architect and engineer. Company headquarters are in Grand Central Terminal Building, New York.

Russell Paper Can Co., Chelsea, Boston, recently organized, plans operation of local factory for manufacture of paper and corrugated paper containers. Harlow M. Russell is president; S. V. Russell, 209 Highland Street, Chelsea, is treasurer.

Board of Education, Springfield, Mass., has asked bids on general contract for a three-story basement technical high school, with vocational training departments, to cost about \$400,000 with equipment. F. W. S. King, E. C. and G. C. Gardner, 33 Lyman Street, are architects.

United States Rubber Co., Bristol, R. I., is arranging for permanent closing of large part of local mill by end of June and will remove different divisions to plants at Naugatuck, Conn., and Williamsport, Pa., where production will be concentrated. Manufacture of rubber-insulated wire will be continued at Bristol mill.

Follett & Smith, Hills Grove district, Warwick, R. I., are erecting an airplane hangar and machine shop. Benjamin B. Follett, Jr., is business manager.

Two turbines, stokers and other equipment will be required for an electric generating and heating plant to be built by State of Massachusetts at Gardner, Mass. Albert B. Franklin, Inc., 25 Haverhill Street, Boston, is engineer.

Chicago

BOARD of Education, Musselman Building, Quincy, Ill., will install vocational training shops in new three-story and basement high school, 225 x 310 ft., to cost \$1,200,000. General contract has been let to Kaempfen Co., Quincy. W. E. White is secretary of board, in charge.

Northern States Power Co., Minneapolis, Minn., has arranged for a bond issue of \$10,000,000, part of fund to be used for expansion and improvements, including transmission lines. Company is operated by H. M. Byllesby & Co., Inc., 231 South La Salle Street, Chicago.

John S. Gullborg Mfg. Co., 2615 North Ashland Avenue, Chicago, recently organized, plans operation of local factory for manufacture of electrical and mechanical equipment. Company is headed by John S. Gullborg, 2340 Ridge Boulevard. John S. Gullborg, Jr., will also be an official.

Archer-Daniels-Midland Co., Minneapolis, has plans for an addition to grain elevator, to cost over \$1,000,000 with elevating, conveying, screening and other equipment.

Swift & Co., Union Stock Yards, Chicago, meat packers, have taken bids on general contract for a two-story and

basement addition to plant at Sioux City, Iowa, including refrigerating division, to cost close to \$90,000 with equipment.

In connection with expansion program at works of Universal Crusher Co., 625 C Avenue, N. W., Cedar Rapids, Iowa, company plans to engage in new lines of heavy machinery production as soon as building is available, including conveying, screening, loading, washing and allied equipment. New unit will be one story, 65 x 156 ft., and will be equipped primarily for assembling. Norman Hutton, Higley Building, is architect.

Board of Education, Charles City, Iowa, plans installation of manual training equipment in new three-story and basement high school, to cost about \$325,000 and for which bids will be asked on general contract in August. Jacobson & Jacobson, Wesley Temple Building, Minneapolis, are architects; Frank Tustison Co., last address noted, is mechanical engineer.

Regents of Education, State College, Brookings, S. D., will receive bids until July 7 for equipment for addition to power plant, including 450-hp. boiler, stoker, draft fans and other equipment. F. C. W. Kuehn, Huron, S. D., is architect.

Stewart-Warner Corp., Chicago, has recalled between 1000 and 1200 employees because of increase in company's radio division business.

Illinois Central System has added 700 shop employees and work has been resumed at Chicago & Alton shops, which have been reopened on a 5-day week basis. American Car & Foundry Co. has added 100 men in its Chicago foundry and expects to add 250 more to its shop forces soon.

Philadelphia

CONTRACT has been let by Boyertown Burial Casket Co., Boyertown, Pa., to George K. Reebner, 1231 Vine Street, Philadelphia, for a three-story and basement factory branch, storage and distributing plant, 31 x 112 ft., including garage and service unit for company motor trucks and cars, to cost about \$80,000 with equipment.

Autocar Co., Ardmore, Pa., manufacturer of motor trucks and parts, has begun erection of a new factory branch, service, repair and distributing plant at Newark, N. J., on site 100 x 300 ft., to cost about \$70,000 with equipment. Unit will be operated by Auto Sales & Service Co., an affiliated organization, now located at 221 Prelinghuysen Avenue, Newark. Horace W. Castor, Architects Building, Philadelphia, is architect.

Reading Co., Reading Terminal, Philadelphia, has awarded general contract to Hughes-Foulkrod Co., 1505 Race Street, for two-story line maintenance building with repair and service departments, 42 x 72 ft., at Wayne Junction, to cost about \$90,000, including garage unit for company motor trucks and cars. Clark Dillenback, address noted, is company engineer.

Alexander Weiss, 2014 North Fifty-sixth Street, Philadelphia, and associates have organized Safety Gas Lighter Corp., with capital of \$25,000, and plan operation of factory for manufacture of safety gas lighter appliances and devices, including parts and assembling. Maurice Finkel, 2018 North Fifty-sixth Street, is interested in company.

George P. Pilling & Son Co., Twenty-third and Arch Streets, Philadelphia, man-

ufacturer of surgical instruments, has awarded general contract to Haverstick-Borthwick Co., Schaff Building, for alterations and improvements in factory, to cost over \$25,000. Ballinger Co., Twelfth and Chestnut Streets, is architect and engineer.

Frank C. Foote, 121-23 Chestnut Street, Harrisburg, Pa., purchasing agent, Harrisburg School District, is asking bids until June 29 for small tools, equipment and supplies for metal-working, automobile, machine, wood-working, print and electric shops and foundries in senior and junior high schools; also for supplies for mechanical drawing, art department and general science laboratories.

Hahn Motors, Inc., Hamburg, Pa., has been organized with capital of \$250,000 to take over and expand local plant and business of Hahn Motor Truck & Wagon Co. New company will develop branch for production of aircraft motors and equipment. It is headed by Adam G. Hahn, S. A. Diener and E. C. Smith, Hamburg, and William G. Hahn, Allentown.

Mineral-Lac Paint Co., 67 Laurel Street, Philadelphia, has leased two-story and basement factory at 1024-28 Buttonwood Street, totaling over 15,000 sq. ft. floor space, and will remodel for manufacture of paints and paint products, with grinding, mixing and other departments.

Board of Education, Trenton, N. J., is arranging appropriation of \$38,500 for manual training equipment for new central high school; also \$18,000 for science furniture.

Cleveland

PLANS have been completed by Gulf Refining Co., Frick Annex, Pittsburgh, for new bulk oil storage and distributing plant at Cleveland, one-story boiler plant, one-story machine shop, pumping plant, tank car loading rack and other units to cost over \$200,000. Company will also build a one-story service, repair and garage building, 85 x 156 ft., for company motor trucks and cars.

Electric Storage Battery Co., Nineteenth Street and Allegheny Avenue, Philadelphia, manufacturer of storage batteries, parts, etc., has leased one and two-story building, 155 x 225 ft., to be erected at 6400 Herman Avenue, Cleveland, for which general contract has been let to H. K. Ferguson Co., Cleveland. A one-story office, 45 x 150 ft., will also be built. Leasing company will use as a new branch plant, primarily for assembling.

Libbey-Owen-Ford Glass Co., Nicholas Building, Toledo, Ohio, manufacturer of sheet glass products, has arranged for purchase of plants of National Plate Glass Co., Ottawa, Ill., a subsidiary of General Motors Corp., and will operate as branch factories, providing increase in present capacity. A price of about \$9,000,000 was given for National plants, including a tract of glass sand deposits, which will be developed by new owner. In connection with purchase, General Motors Corp. has placed a seven-year contract with Libbey-Owen-Ford Co. for shatterproof glass requirements for all lines of automobiles under its direction, award totaling over \$45,000,000 for period noted.

Hilton Steel Co., Warren, Ohio, care of George Bunting, Warren, attorney, recently organized by Jack L. Hilton, Warren, and associates with capital of



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\$35,000 preferred stock and 350 shares of common stock, no par value, plans operation of local works for manufacture of steel specialties. A. F. Steele, Warren, is interested in new company.

Hill Clutch Machine & Foundry Co., Cleveland, on July 1 will take over Cleveland Knife & Forge Co. and business of two companies will be merged at Hill Clutch plant, 6400 Breakwater Avenue. N. W. Ralph Perkins is president of Hill Clutch Co. A. C. McDaniel, who has been president of Cleveland Knife company, will be vice-president and general manager of consolidated company; H. S. Donaldson, vice-president; John R. Short, secretary, and M. G. Firestone, treasurer.

A. W. Hecker has established a plant at 1976 East Sixty-sixth Street, Cleveland, for manufacture of tools, dies and fixtures and will also engage in production machine work. About \$45,000 worth of equipment has been installed.

Weber Brass Co., Cleveland, has moved to 3344 Payne Avenue.

Milwaukee

PLANS have been announced by Pittsburgh & Ashland Coal & Dock Co., Ashland, Wis., for construction and equipment of complete briquetting plant costing about \$250,000. Work is to begin July 1 and plant is to be ready Nov. 1.

Allen-Westphal Electric Co., Janesville, Wis., has been organized by W. J. Allen and Fred Westphal, formerly of Rockford, Ill., and has taken over office building of former Townsend Tractor Co., which is being remodeled for electric motor manufacture and repair work, electric welding, etc.

Fox River Valley Municipalities Association has been organized with headquarters at Appleton, Wis., with a view of building metropolitan sewerage and sewage disposal system serving twelve cities and villages along Fox River north and south of Appleton. Engineer has not yet been selected, but cost is estimated at more than \$5,000,000. A. E. McMahon, Menasha, Wis., is chairman of executive committee.

Trap Rock Co., 1128 Plymouth Building, Minneapolis, Minn., has plans by John Wunder Co., consulting engineer, Minneapolis, for new rock crushing plant at Dresser Junction, Wis., to cost about \$100,000 complete. Bids are to be taken at once.

Milwaukee Sewerage Commission, Jones Island, contemplates erection of a machine and repair shop, to cost \$60,000 at Jones Island sewage disposal plant. Addition of incinerating plant costing \$125,000 is also under consideration. James L. Ferebee is chief engineer.

Common Councils of Beloit, Wis., and South Beloit, Ill., have taken preliminary steps toward erection of joint sewage disposal plant, costing about \$200,000.

Gardner Machine Co., Beloit, Wis., is operating at capacity on a large order from Soviet Government.

Cincinnati

CONTRACT has been let by Board of Trustees, University of Cincinnati, Clifton Avenue, Cincinnati, to Parkway Construction Co., Provident Bank Building, for new mechanical shop and ware-

house unit, with service department, 56 x 112 ft., to cost about \$100,000 with equipment. Hunt & Allan, Eagle Savings Building, are architects.

Dayton Rubber Co., 2345 West River-view Avenue, Dayton, Ohio, will soon take bids on general contract for a one-story addition, 100 x 160 ft., for storage and distribution, to cost over \$50,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

Mid-East Body & Equipment Corp., Cincinnati, care of Robert A. Black, American Building, attorney, recently organized by Albert Bode, Cincinnati, and associates, plans operation of local works for manufacture of motor truck bodies and equipment. It is understood that company will be associated with Bode Bodies, Inc., 1655 Central Avenue, truck bodies. William G. Meyers, Cincinnati, is interested in new organization.

Contracting Officer, Wright Field, Dayton, Ohio, will receive bids until July 6 for 80 hub assemblies; until June 29 for 80 starter assemblies.

State Board of Education, Nashville, Tenn., will soon take bids on general contract for a three-story and basement industrial art school, to cost about \$150,000 with equipment. Marr & Holman, Stahlman Building, are architects.

Colonial Stages, Inc., 2123 Highland Avenue, Norwood, Cincinnati, has asked bids on general contract for a one and two-story motor bus service, repair and garage building, to cost about \$85,000 with equipment. J. R. Biedinger, Traction Building, is engineer.

Board of Education, Newport, Ky., is considering installation of manual training equipment in two-story and basement addition to high school, for which bids have been asked on general contract, to cost about \$150,000. C. C. & S. K. Weber, Ingalls Building, Cincinnati, are architects; Fosdick & Hilmer, Union Trust Building, Cincinnati, are mechanical engineers.

Pittsburgh

NEGOTIATIONS have been completed by National Transit Pump & Machine Co., Oil City, Pa., manufacturer of pumping machinery and other equipment, for purchase of Curtis rotary pump division of Pittsburgh Machine Tool Co., Brad-dock, Pa., including patents and equipment. Purchasing company will continue manufacture of Curtis pumps and will remove machinery to a new building at Oil City plant, where enlarged production facilities will be provided. National Transit company has expansion in progress at works, consisting of seven one-story units to cost over \$500,000 with equipment. James H. Raymaker is general manager.

Board of Education, Irwin, Pa., plans installation of manual training equipment in new junior high and grade school, for which general contract has been let to Michael Thomas, Blairsville, Pa., to cost about \$175,000. Hunter & Caldwell, Central Trust Building, Altoona, Pa., are architects.

General Electric Co., East Lake Road, Erie, Pa., has plans for an addition to local plant, used largely for production of electric refrigerating equipment, to cost over \$60,000. It will be designed primarily for storage and distribution. D. F. Smith is superintendent at Erie works.

City Council, Sharpsburg, Pa., has engaged Barton R. Shover, Oliver Building,

Pittsburgh, consulting engineer, to make surveys and plans for extensions and improvements in local municipal electric light and power system.

Westinghouse Electric & Mfg. Co., East Pittsburgh, has developed new electric-operated washing machine and is planning production of new unit in four different models as a branch of electric appliance division.

Board of Education, Lawrence Park, Pa., contemplates installation of manual training equipment in new two-story and basement high school, for which bids have been asked on general contract, to cost about \$160,000. C. S. Kirby, Commerce Building, Erie, Pa., is architect.

Erie Foundry Co., Erie, Pa., is operating at capacity with normal working force. Company recently secured contract for electric and steam trip hammers from Soviet Russian Government, to be used in new automobile manufacturing plants now in course of erection at Novgorod, Russia.

Gulf States

BOARD of Trustees, Texas Agricultural and Mechanical College, College Station, Tex., has plans for a new multi-story agricultural engineering building, to cost about \$200,000 with equipment. A new chemistry building will be erected at a cost of \$350,000 with machinery. Dr. F. E. Giesecke, college architect, is in charge.

West Texas Utilities Co., Abilene, Tex., has acquired electric light and power, ice-manufacturing and water plants at Dalhart, Tex., and will operate as central station utilities in future. Purchasing company contemplates expansion and improvements, including transmission lines.

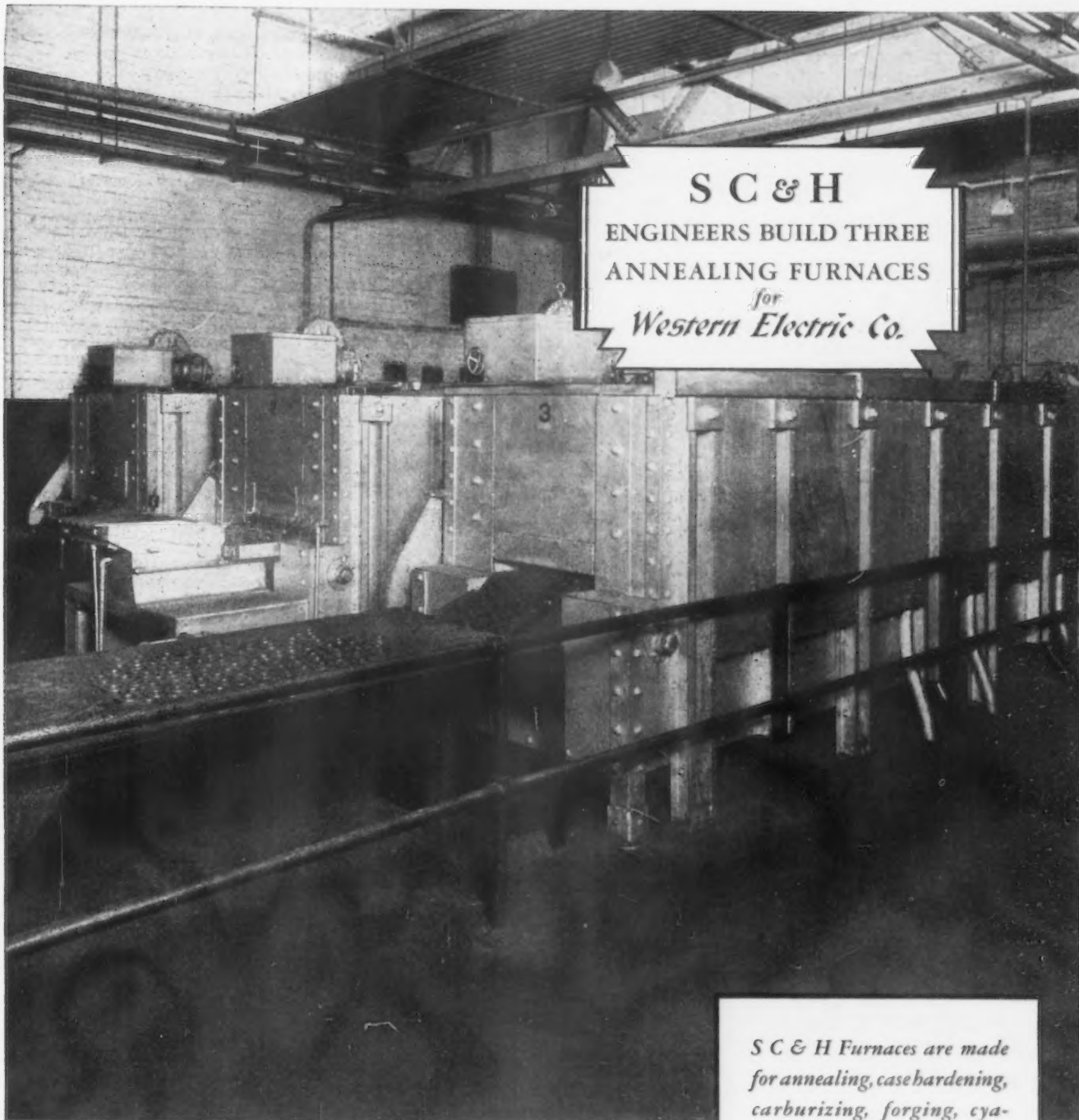
Construction Quartermaster, United States Army, Shreveport, La., has awarded a general contract to K. C. Wilson, Shreveport, for new shops and buildings at Barksdale Field, to cost \$97,840 exclusive of equipment.

Mosher Steel & Machinery Co., Dallas, Tex., manufacturer of steel tanks and other plate products, castings, structural steel, etc., has leased property in industrial district at Tyler, Tex., and contemplates new factory branch, storage and distributing plant, to cost close to \$50,000 with equipment.

Everybody's Independent Refining Co., Mineola, Tex., is being organized by local interests headed by R. J. Worthington and J. F. Pickle, with capital of \$500,000, to carry out oil refinery project at West Mineola, previously developed under name of Independent Refining Co. Site has been purchased. Initial plant will cost close to \$400,000 with storage and distributing facilities, pipe line to Glade-water, Tex., oil fields and other facilities.

Southern Cotton Oil Co., Andalusia, Ala., has approved plans for a three-story and one-story addition to local mill, totaling about 12,500 sq. ft. floor space, to cost over \$50,000 with equipment.

Officials of Southern Sugar Co., Clewiston, Fla., are arranging for reorganization under name of United States Sugar Corp., with capital of 545,000 shares of common stock. It is planned to authorize a bond issue of \$10,000,000, part of which only will be sold at present time. New company plans reduced operating costs, including new agricultural equipment and methods for sugar cane service. By-products department will also be developed to



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eliminate previous waste from such materials. Present plant has a production rating for grinding 600,000 tons of sugar cane a year. Company has been in receivership several months.

United Gas Co., Berger, Tex., an interest of Electric Power & Light Corp., 2 Rector Street, New York, is arranging financing for its operating subsidiary, United Gas Public Service Co., which plans stock issue later totaling \$20,000,000, part of proceeds to be used for expansion and improvements, including pipe lines.

Magnolia Petroleum Co., Dallas, Tex., a subsidiary of Standard Oil Co. of New York, 26 Broadway, has begun work on a new bulk oil storage and distributing plant at Center, Tex., to provide for capacity of about 400,000 bbl., to cost over \$100,000 including increase in pipe lines to Center and vicinity.

Indiana

PLANS are under way by Guide Lamp Co., Anderson, manufacturer of automobile lamps and equipment, for two-story addition, 45 x 100 ft., to cost close to \$40,000 with equipment.

Board of Education, Plainfield, has authorized installation of manual training equipment in new two-story and basement high school, for which general contract was recently let to Charles E. Cooper, Plainfield, to cost about \$100,000. Parker & Faulstich, Board of Trade Building, Indianapolis, are architects.

Andrew J. Klaisler, 406 South Rural Street, Indianapolis, and associates have organized Klaisler-Berry Engineering Co., and plan operation of local factory for production of patented automobile clutches and kindred products. Robert Berry, Indianapolis, will be an official of new company.

Board of School Commissioners, Knightstown, has awarded general contract to M. Cutshall Co., Akron, Ohio, for new two-story and basement high and grade school to cost \$165,000, and plans installation of manual training equipment. McGuire & Shook, Knights of Pythias Building, Indianapolis, are architects.

Madison Light & Power Co., Madison, has applied for permission to carry out expansion, including new transmission lines to Belleview, Bryantsburg and vicinity.

Perfect Circle Co., Hagerstown, manufacturer of piston rings and other automotive equipment is running on a capacity schedule at its Hagerstown, Newcastle and Tipton plants. Both April and May production and distribution have broken all previous high records.

St. Louis

CONTRACT has been let by Doane Carton Co., 912 North Market Street, St. Louis, manufacturer of folding paper boxes and cartons, to A. L. Rascher Construction Co., 4108 Clayton Road, for a one-story and basement addition, 60 x 80 ft., to cost about \$20,000 with equipment. Clymonts & Heinicke, Wainwright Building, are architects.

State Board of Affairs, Capitol Building, Oklahoma City, Okla., W. C. Hughes,

chairman, plans new power plant at Western Oklahoma State Hospital, Supply, Okla., to cost about \$85,000 with equipment.

Kansas City Southern Railway Co., Eleventh and Wyandotte Streets, Kansas City, Mo., has awarded general contract to M. A. Long Co., 10 West Chase Street, Baltimore, for an addition to grain elevator, 85 x 185 ft. and 185 ft., high, occupied under lease by Norris Grain Co., Board of Trade Building, to cost about \$200,000 with elevating, conveying, screening and other equipment. A. N. Reece is chief engineer, address noted.

Frost Electric Screen Mfg. Co., St. Louis, recently organized by James H. Hennessy, 6317 Washington Street, and associates with capital of \$50,000, plans operation of local factory for manufacture of electrical and mechanical specialties.

Banfield Brothers Packing Co., Tulsa, Okla., meat packer, has taken over plant of Fort Smith Packing Co., Fort Smith, Ark., and will operate as a branch. Expansion will be carried out at once, including erection of new unit at Fort Smith, to cost close to \$100,000 with equipment.

Transcontinental & Western Air, Inc., 420 Lexington Avenue, New York, will establish maintenance and repair departments, also general offices at municipal airport at Kansas City, Mo., and will remove shops and other divisions now at Columbus, Ohio, and Los Angeles to that place, where increased facilities will be provided for motor and airplane service, repairs, parts production, etc. Richard W. Robbins is managing director.

United States Potash Co., an interest of Pacific Coast Borax Co., 108 West Sixth Street, Los Angeles, is planning erection of a potash refinery about five miles from Loving Station, N. M., where potash deposits have been acquired. Initial plant will have capacity of over 2000 tons a day and will cost more than \$1,000,000. Atchison, Topeka & Santa Fe Railroad Co., Topeka, Kan., has secured permission to build a line to new plant site from junction with present line at Loving Station.

Detroit

PLANS are being considered by Buhl Aircraft Co., Maryville, Mich., manufacturer of airplanes and parts, for a new plant at St. Clair, Mich., to cost over \$90,000 with equipment. Present works will be removed to new location and capacity increased. Company has recently removed a portion of plant to new site.

City Council, Dearborn, Mich., plans installation of incinerating, conveying and other equipment in new refuse and garbage disposal plant on 17-acre tract on River Rouge, to cost about \$700,000 with machinery. Hubbell, Hartgering & Roth, Buhl Building, Detroit, are engineers.

Detroit Hydrostatic Brake Corp., Detroit, recently organized by Charles T. Bush, 149 East Larned Street, and associates, plans operation of local factory for manufacture of brakes and brake equipment. Charles E. Allinger, Detroit, is interested in new company.

Edison Sault Electric Co., Sault Ste. Marie, Mich., and Mackinac Island Power Co., Mackinac Island, Mich., associated, have plans for a joint steel tower transmission line from Sault Ste. Marie, where hydroelectric generating plant is located

on St. Mary's River, to St. Ignace, Mich., and vicinity, to cost over \$175,000 with power substation facilities. Company engineering department is in charge.

Rotary Utility Corp., recently organized, will occupy part of plant of Multi-Selecto Phonograph Co., Grand Rapids, Mich., for production of new type of stainless steel chairs for lunch counters, etc., with patented rotary control device for counter chairs of pedestal design. Initial operations will be given over to assembling. Company has contracted with Henry P. Nordmark, with works on Butterworth Street, for manufacture of rotary automatic control equipment, and has placed orders for castings and parts with other local plants. Leon G. Agon, Grand Rapids, is president and James J. McGerry, vice-president and general manager.

Pennsylvania Salt Mfg. Co., Wyandotte, Mich., will proceed with a three-story addition to local plant, for which contract for superstructure recently was let to Whitehead & Kales Co., Detroit, to cost over \$70,000 with equipment. Headquarters are in Widener Building, Philadelphia.

Metalcraft Heater Corp., Grand Rapids, Mich., has arranged for an increase in capital from 100,000 to 200,000 shares of stock, no par value, for general expansion.

Pacific Coast

BIDS are being asked by United States Signal Corps, General Depot, Procurement Division, Presidio of San Francisco, until July 8 for one motor-driven saw.

Shaw Motor Co., Ltd., Emerson and Homer Streets, Palo Alto, Cal., has plans for a one-story service, repair and garage building, 105 x 225 ft., to cost about \$90,000 with equipment. J. D. Campbell, 15 Crescent Street, is engineer in charge.

Board of Education, Ventura, Cal., has awarded general contract to Rudolph & Barr, 1547 East Main Street, for a new one-story shop at Ventura Junior College, to cost close to \$75,000 with equipment. John C. Austin and Frederic M. Ashley, Chamber of Commerce Building, Los Angeles, are architects.

Portland General Electric Co., Portland, has arranged for a note issue of \$7,500,000, part of fund to be used for extensions and improvements, including transmission lines.

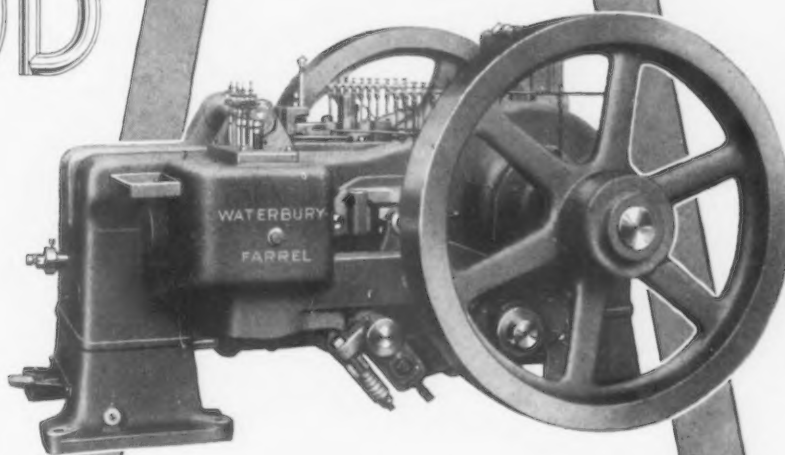
American Smelting & Refining Co., Salt Lake City, Utah, has plans for a tramway system at its mining properties at American Fork Canyon, American Fork, Utah, to replace a rail line. It will include ore cars, operating mechanism and other mechanical equipment.

Oakland Laundry Co., 730 Twenty-ninth Street, Oakland, Cal., plans power house and other equipment in connection with a new laundry plant to cost over \$200,000 with machinery. Miller & Warnecke, Financial Center Building, are architects.

Carl F. Piper, 2120 Funston Place, Oakland, Cal., and associates have organized Paramount Steam Turbine Co., Ltd., Oakland, with capital of \$200,000 and plan operation of local works for production of steam turbine equipment. John L. Easterly, Healdsburg, Cal., will be one of heads of new company.

Board of Trustees, California Institute of Technology, Pasadena, Cal., has

ROD



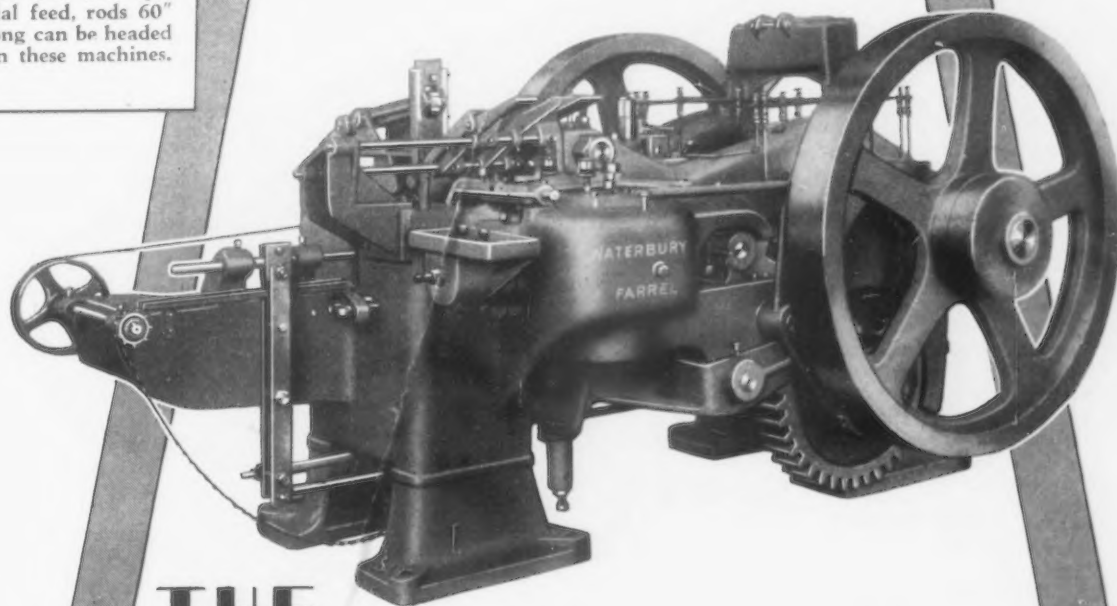
HAND FEED

The hand machines are operated through a one-revolution clutch, treadle controlled. The open die double blow machine shown is for $\frac{3}{8}$ " rods, any desired length; it weighs 41,000 lbs.

SEMI-AUTOMATIC

Semi-automatic header with adjustable feed. Maximum capacity: 24" long, $\frac{3}{8}$ " diameter. Production 50 per minute; weight 25,000 lbs. With special feed, rods 60" long can be headed on these machines.

HEADERS



THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY

BOLT, SCREW, RIVET, NUT, ROD AND SPOKE MACHINERY

HOME OFFICE AND WORKS: Waterbury, Conn. WESTERN SALES OFFICE: Cleveland, Ohio

Business as Others See It

Digest of Current Financial and
Economic Opinion

ALTOGETHER too much promiscuous advice and too little specific performance is the burden of the charge against business and political "leaders." There are enough things wrong with many lines of endeavor, as Benjamin Baker argues in *Annalist*. "If any real progress is to be made toward getting rid of the present maladjustments, the indispensable first step is to drag out the facts and to face them squarely. . . . But . . . we do not now do a tenth as well as we know how to do," he concludes.

Reparations and Armaments

Internationally, the air is believed to have been cleared by President Hoover's helping hand extended to Germany. Incidentally, some one has pointed out that current German expenditure on armament and reparations, combined, is \$8.90 a head, whereas France is paying \$10.40, England \$11.50 for armaments alone.

Numerous observers take the view that the slow climb back to "normal" has begun. Harvard Economic Society has charted several significant factors, superposing the current curves upon those for 1919-1922. From the comparison, the argument is made that we are now on the up-grade, just as, in retrospect, we now can see that such was the case ten years ago.

"Temporary setbacks and un-

equal timing of upturn in different activities marked the beginning of recovery then, just as they seem to be doing now," is the way it is expressed. "An outstanding difference between the periods—the absence at present of a large building shortage—is apparently not preventing improvement now, though it will operate to make recovery more moderate."

We have become more responsive to good than to bad news, thinks Theodore H. Price, writing in *Commerce and Finance*, "despite the dire predictions of an economist recently in America." And the *New York Times* notes, from the *Annalist* weekly index, "the first rise in commodity prices which has appeared in over three months."

Still Hammering at Wages

Wage scales, in certain "protected" classes, are subject to continual economic and editorial bombardment. "Despite all the efforts to introduce what is called the 'humane' element," says *Financial Chronicle*, "wages kept up in defiance of the unemployed eager and anxious to work is not a humane proposition. . . . Employers have hard work, under the deadened condition of trade, to keep the plant open and running; yet they are not allowed to reduce wages. By refusing to consider the lowering of wages, union labor digs its own grave by forcing employers

to introduce more machines. More men would be employed today but for this stubborn policy."

And *Annalist* sees the proposed higher railroad freight rates as a mere stop-gap "before recourse is taken to reduction of railroad wages."

Building Up Our Savings Reserves

Alexander Hamilton Institute says that one of the contributing factors to the current depression is that, in the years preceding it, "people spent too much and saved too little. Part of the slow process of recuperation must be a building up of savings." From 1920 to 1925 savings deposits increased 8.1 per cent yearly. Since 1925 the highest rate of gain has been only 4.4 per cent, and in 1929 there was an actual decline. The total is now slowly rising again.

Brookmire joins Harvard in predicting a moderate rate of recovery, and the poor outlook for building, again, is cited as the reason. Brookmire looks to the establishment of an up-trend in commodity prices to start a "scramble to replenish stocks of all kinds. . . . Such a development, in a number of important lines, is not at all impossible this fall. . . . Thus setting in motion that upward spiral which will lead to a new period of world prosperity. This should be well under way by winter."

awarded general contract to Wurster Construction Co., 816 West Fifth Street, Los Angeles, for two new three-story laboratory and engineering buildings to cost about \$500,000 with equipment. Mayers, Murray & Philip, 2 West Forty-seventh Street, New York, are architects.

Puget Sound Power & Light Co., Seattle, is considering extensions and improvements in plant and system in vicinity of Marysville and Arlington, Wash., including power line construction, to cost about \$40,000.

City Council, Prescott, Ariz., plans installation of electric-operated pumping machinery and other power equipment, pipe lines, etc., in connection with extensions and improvements in municipal waterworks, for which a fund of \$200,000 is being arranged. Arthur J. Kline, Prescott, is engineer.

Northwest Cities Gas Co., Lewiston, Idaho, is planning expansion and improvements, including installation of a new gas generating plant, high pressure gas holder and other equipment, to cost about \$100,000.

Jones-Munn Tool Co., Ltd., Los Angeles, care of C. E. McDowell, Pacific Finance Building, attorney, recently organized by W. S. Jones, Signal Hill, Cal., and Charles E. Munn, Long Beach, Cal., with capital of \$25,000, plans operation of local factory for manufacture of tools and other equipment.

Foreign

PLANs are being considered by United Oil Industry of Soviet Russian Government, Moscow, Russia, for new oil base and terminal at Bergen, Norway, with tanks, pumping, loading and other equipment. Another bulk oil terminal is proposed at Lofoten, Norway. Project will cost over \$1,000,000. Amtorg Trading Corp., 261 Fifth Avenue, New York, is official buying agency for Soviet Union.

Metal Box & Printing Industries, Ltd., London, England, has purchased controlling interest in British Can Co., London, manufacturer of tin cans, etc., and will consolidate. Purchasing company plans to operate a group of over 12 metal box and can-manufacturing plants in England and on Continent and will increase production facilities. Continental Can Co., 1 Pershing Square, New York, has large interest in Metal Box company.

Manager, New Zealand Government Railways, Wellington, New Zealand, will receive bids until Aug. 27 for steel or steel alloy poles to support steel cantilever arms and feeder wires, and to act as pull off supports for catenary overhead electrification system; bids will also be received at same time for telephone cable equipment for system between Wellington and Palkakariki, about 24 miles, with accessories.

Swadeshi Rayon Silk Mills, Ltd., Calcutta, India, recently organized with capital of 20,000,000 rupees (about \$7,200,000) has purchased tract on Kabani River, about 14 miles from Mysore, for new rayon mill, to include power house, machine shop and other units, entire project to cost over \$1,500,000 with equipment. This is said to be first rayon mill to be erected in India.

Canada

CONSTRUCTION will start at once on erection of a differential flotation mill at Geneva Station, Ont., for Towamac Exploration Co., to cost \$100,000. Alderson & Mackay, 1010 St. Catherine Street, West, Montreal, are engineers.

Holtby Brothers, Ltd., 61 Hepburn Street, Toronto, has been awarded contract for alterations and addition to plant of Wrought Iron Range Co., Ltd., 149 King Street West, to cost \$30,000.

Contracts have been awarded by Jenkins Brothers, Ltd., 617 St. Remi Street West, Montreal, for erection of a foundry at Lachine, Que. A. F. Byers & Co., Ltd., 1226 University Street, Montreal, has general contract at \$245,000.

Lone Star Timber & Pulp Co., Ltd., Seattle, Wash., is contemplating establishment of a pulp and paper mill at Port Renfrew, B. C., to cost \$2,000,000.

